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Pipeline Inspections

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Manual 005: Pipeline Inspections

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Introduction

About this Manual

Manual 005: Pipeline Inspections (*Manual 005*) is a resource document and tool for the Alberta Energy Regulator (AER) field operations staff. *Manual 005* replaces *Directive 066: Requirements and Procedures for Pipelines*, which has been rescinded.

Inspector Safety and Conduct

Safety is important to the AER, with field operations staff conducting their work in accordance with recognized standards of practice. When identified, field operations staff will also report unsafe operating conditions and practices to the licensee and to Alberta Workplace Health and Safety.

Field operations staff can conduct surveillance activities at any time. However, company policy is considered when giving notification for lease entry.

Field operations staff may ask that a pipeline operator be present during surveillance, and they may have a discussion with a licensee's on-site personnel. This is an opportunity to establish and enhance relationships, exchange site and operational information, educate industry about AER requirements and processes, and ensure that remedial or follow-up work is done.

Field operations staff should have a copy of *Manual 005* and any relevant regulatory documents available when conducting surveillance activities.

A field inspection summary card is to be left on site once an inspection is complete, although it is not necessary to leave a card if inspection results have been reviewed with a licensee representative.

Industry Compliance

Industry may use *Manual 005* as a guide for its own compliance management systems—however, the AER also recognizes the importance of considering issues beyond the scope of this document. Efficient, safe, orderly, and environmentally responsible development of Alberta's energy resources is an outcome best achieved through the use of this document with broader management- and systems-based approaches.

While *Manual 005* identifies many noncompliant event statements—along with their referenced requirements from the *Pipeline Act*, the *Pipeline Rules*, the Canadian Standards Association (CSA),[1] and relevant AER directives—it is not an exhaustive inventory. Industry is responsible for understanding and complying with **all** pipeline-related regulatory requirements, including the development of safety loss

[1] *Canadian Standards Association (CSA)* requirements receive their regulatory authority through *Pipeline Rules 9[1] – 9[4].*

management systems, effective integrity management programs, and suitable risk assessment / risk mitigation strategies.

In accordance with section 9 of the *Pipeline Rules*, the requirements for the design, construction, testing, operation, maintenance, repair, and leak detection of pipelines are provided in *CSA Z662-15*, *Z245.11*, *Z245.12*, and *Z245.15*, unless otherwise modified, altered, changed, or replaced by the *Pipeline Rules*.

During the course of surveillance activities, field operations staff may ask for access to a licensee's operations or controlled areas, or they may inspect or test a licensee's pipeline activities and inspect all books, records, and documents that pertain to the construction, operation, and maintenance of pipelines or to ground disturbance done in accordance with section 5 of the *Pipeline Act*. A licensee who interferes with, or fails to assist a member of the AER in the exercise of this authority may be guilty of an offence under section 52(3) of the *Pipeline Act*.

Field operations staff will use education and prevention activities to monitor industry for compliance with AER requirements and conditions of approval. Staff may also, in accordance with section 34(2) of the *Pipeline Act*, at any time require that the licensee of a pipeline inspect, investigate, or test the pipeline, and they may prescribe the manner in which these activities are done. A licensee's failure to follow the direction of field operations staff also may result in the licensee being found guilty of an offence under the *Pipeline Act*.

The AER is committed to continuous improvement. As such, *Manual 005* will be regularly updated to ensure that noncompliant event statements reflect current regulatory requirements.

How to Use This Manual

Manual 005 is organized into key technical areas, with each section containing related noncompliant event statements and their relevant regulatory reference. The effective identification of noncompliance entails a review and understanding of the referenced requirements to ensure the correct application of the associated noncompliant event statements.

Staff may use any section of *Manual 005* during inspections, regardless of the type or scope of the inspection being conducted.

The noncompliance items in the manual are structured as follows:

Manual #	Risk rating	Description
2.7.5.1	High Risk	Pipe not supported to prevent excessive stresses and axial or lateral friction forces in the pipe. (*CSA Z662-15* [4.9.2.1]) ▲

- The **Manual #** is the number used by the Field Inspection System (FIS) and the Digital Data Submission (DDS) system to identify inspection items in the database—this number does not relate to sections in AER directives, acts, or rules.

- The **Risk rating** is the predetermined risk rating associated with noncompliance with the requirement. It is based on health and safety, environmental impact, conservation, and stakeholder confidence in the regulatory process.
- The **Description** is the noncompliant event statement and associated requirement/rule.
- The "▲" symbol indicates a noncompliant event statement that is typically only identified after a failure or incident.

Inspection Results

1 Licence and Approvals

1.1 General

Manual #	Risk rating	Description
1.1.5.1	High Risk	Licence not obtained before pipeline construction, or before any operation that prepares for or is incidental to the construction of any part of a pipeline.* (*Pipeline Act* 6[1]) **Exception to this limitation is specified in Pipeline Act 6[2]* *Note: An applicant must obtain the appropriate AER licence(s) prior to commencing any site preparation, construction, or operation. (Pipeline Rules 3)* *Applicants are not permitted to initiate prelease construction prior to acquiring an AER licence. Part 6, sections 11 and 12 of the Oil and Gas Conservation Act (OGCA) and part 4, section 6 of the Pipeline Act prohibit any preparatory or incidental operations on private or public lands prior to the applicant receiving a well, facility, or pipeline licence or approval. This includes work such as access road construction, pipe stringing, bending, and welding, and facility equipment installation. Applicants must limit prelease activities to surveying and obtaining soil samples through shovel digs or auger samples no more than 5 to 8 centimetres (cm) in diameter. (Directive 056, section 3.3 (3))*
1.1.10.1	Low Risk	Application not submitted* to amend the licence where the licensee has changed the pipeline before completing construction. (*Pipeline Act* 10[1]) **Exception: as specified in Pipeline Act 6[2](a)(b), and Pipeline Rules 3[3]* *Note: This statement applies to changes to any information that is stated on the licence. For example, changes to outside diameter, wall thickness, materials used, type and grade, joint type, internal coating, to and from locations, or facilities and environment* ***before*** *the pipeline goes into service.*
1.1.15.1	High Risk	Application not submitted after the construction of a pipeline, where a licensee changes, alters, adds to it, relocates, diverts, or extends the pipeline. (*Pipeline Act* 11[1]*) **Refer to Pipeline Act 11[3] and Pipeline Rules 3[3] for exceptions, and to Pipeline Act 11[4] for emergency situations.* *Note: This statement applies to changes to, for example, outside diameter, wall thickness, materials used, type and grade, joint type, internal coating, to and from locations, or facilities and environment* ***after*** *the pipeline goes into service.*
1.1.16.1	Low Risk	Licensee removes a pipeline or part of a pipeline without obtaining approval from the AER, or having been otherwise authorized by the AER. (*Pipeline Rules* 84*)* *Note: "Otherwise authorized by the AER" may include authorization given by the field centre.*
1.1.20.1	Low Risk	Licensee does not notify the AER that the work on a pipeline will not be started or completed. (*Pipeline Rules* 5[2]) *Note: Licensee must notify the AER at least 30 days before the expiry date stated on the licence that work on the pipeline will not begin, in accordance with Directive 056. (Pipeline Rules 5[1])*

Manual #	Risk rating	Description
1.1.25.1	Low Risk	Pipeline constructed on, across, over, or under a road without approval of the local authority. (*Pipeline Act* 39[1]) *Note: Be aware of CSA Z662-15 [4.12.1.3] regarding angle of crossing.*
1.1.30.1	Low Risk	Pipeline parallel to a road is within 30 metres (m) of the boundary of the road without approval of the local authority. (*Pipeline Act* 39[2])
1.1.35.1	Low Risk	No approval from the local authority to have a bend in the pipeline within the boundaries of a road or within 8 m of the boundary of a road. (*Pipeline Act* 39[3])
1.1.40.1	High Risk	No approval from the owner before constructing a pipeline on, across, over, or under an irrigation canal or ditch. (*Pipeline Act* 41) *Note: Irrigation canal or ditch under the Irrigation Districts Act, or a drainage ditch under the Drainage Districts Act.*
1.1.45.1	High Risk	No AER approval where pipeline construction interferes with the present workings or obstructs any openings to a mine or quarry. (*Pipeline Act* 44)
1.1.50.1	High Risk	Licensee has not obtained all required approvals from the Alberta Boilers Safety Association before putting into operation a steam distribution pipeline with an internal aggregate capacity greater than 0.5 cubic metres. (*Pipeline Rules* 3[2])
1.1.55.1	High Risk	No AER approval for nonstandard* materials, components, or methods prior to their use. (*Pipeline Rules* 10[4]) **Nonstandard means materials, components, or methods that are other than those that are included in CSA Z662-15, and as identified in the latest published edition of the code or standard issued by the Canadian Standards Association. See Pipeline Rules 9[1], 10.*
1.1.60.1	High Risk	Licensee did not submit an application for approval to install a liner in a pipeline or part of a pipeline in accordance with *Directive 056*. (*Pipeline Rules* 72)
1.1.65.1	High Risk	Right-of-way (ROW) boundaries for the pipeline are not surveyed in accordance with the *Surveys Act* before construction. (*Pipeline Rules* 4[1]) *Note: In March 2010 the AER granted an exemption to the Federation of Alberta Gas Co-ops Ltd. to comply with Pipeline Rules 4.* *Instead of registering a survey, the co-ops take out a utility ROW on the land title that identifies the presence of a pipeline on an affected property. The co-ops also must submit as-built drawings to the Rural Gas Utilities Branch (RGUB), which provides updated maps to the AER mapping department.* *Gas co-ops are mandatory registrants and users of Alberta One-Call in accordance with the RGUB.*

2 Construction Activities

2.1 Notification

Manual #	Risk rating	Description
2.1.5.1	Low Risk	The AER was not notified, through the DDS system, at least 24 hrs before the start of pipeline construction. (*Pipeline Rules* 2[1], [6])

Manual #	Risk rating	Description
2.1.10.1	Low Risk	The AER was not notified, through the DDS system, at least 48 hours before the start of any pressure test. (*Pipeline Rules* 2[1], [24]) *Exceptions: DDS notification is not required for pressure tests that are part of normal operations or maintenance. That is, testing for other than the qualification of the line, or for Directive 056 requirements (e.g., Maximum operation pressure (MOP), amendments), does not require DDS notification.* *Note: In an emergency, the AER would expect the operator to address the emergency first. The operator would still have 48 hours to let the AER know.*
2.1.15.1	Low Risk	For a pipeline conveying high vapour pressure (HVP) product or natural gas containing >10 mol/kmol H_2S, the AER was not notified at least 48 hours by the licensee prior to commencing: the replacement of short portions of pipeline allowed by section 3[3](a), instrumented internal inspections of the pipeline, or any activity that may result in welding on an in-service pipeline. (*Pipeline Rules* 57[1]) *Note: In an emergency, the AER would expect the operator to address the emergency first. The operator would still have 48 hours to let the AER know. (Pipeline Rules 57[2])*

2.2 Ditch Preparation, Backfill Procedures, and Rehabilitation

Manual #	Risk rating	Description
2.2.5.1	Low Risk	Areas disturbed by pipeline construction activities are not maintained in a condition that adequately controls environmental degradation. (*CSA Z662-15* [6.2.1.1])
2.2.10.1	High Risk	Ditch bottom does not provide suitable support for the piping. (*CSA Z662-15* [6.2.6.3], [13.1.4.4])
2.2.15.1	High Risk	Backfill material for reinforced composite or polyethylene pipe is not free of rocks and debris and does not extend 150 millimetres from the pipe in all directions. (*CSA Z662-15* [13.1.4.4])
2.2.20.1	High Risk	Licensee has not taken suitable measures to prevent damage to the pipe or coating that may occur during backfill or subsequent surface activities. (*CSA Z662-15* [6.2.7.1], [6.2.7.2])
2.2.25.1	High Risk	Backfilling has caused distortion (e.g., flattening, ovality, etc.) to the pipe that has been detrimental to the operation of the piping or to the passage of cleaning or internal inspection devices. (*CSA Z662-15* [6.2.7.3])
2.2.30.1	High Risk	Backfilling was not done in a manner that prevents excessive subsidence or erosion of the backfill and support material. (*CSA Z662-15* [6.2.7.4])
2.2.35.1	High Risk	Clean up and restoration of areas disturbed during pipeline activities were not restored to a stable condition or maintained to control erosion. (*CSA Z662-15* [6.2.9]) *Note: This statement applies to new construction and repairs, and to new and used materials.*
2.2.40.1	Low Risk	For reinforced composite pipe installed by ploughing, an assessment was not done to ensure that the soil is adequate to support the pipe and that it will not damage the pipe. (*CSA Z662-15* [13.1.4.4])

2.3 Depth of Cover

Manual #	Risk rating	Description

2.3.5.1	High Risk	The minimum earth cover for any operating or discontinued pipeline does not meet the greater of the minimum cover requirements specified by *CSA Z662-15* (4.11.1, 4.11.2, 13.3.4.5), the *Pipeline Rules*, and the AER, or as otherwise permitted by historical standards or regulatory requirements at the time of construction. (*Pipeline Rules* 20[2])
		
		Clarification
		See Pipeline Rules 20(1), and CSA Z662-15, table 4.9:
		• *ROW of a road, including travelled surface of road (CSA):* ***1.2 m***
		• *ROW of a highway (Pipeline Rules [PR]):* ***1.4 m***
		• *ROW of a railway (limited by PR):* ***0.80 m***
		• *Below base of rail, within 7 m of an outside track (CSA):*
		  ▪ ***1.20 m*** *(cased)*
		  ▪ ***2.00 m*** *(uncased)*
		• *Water crossing (CSA or PR):* ***1.20 m****
		• *Drainage or irrigation ditch invert (limited by PR):*
		  ▪ ***0.80 m*** *(normal excavation)*
		  ▪ ***0.80 m*** *(rock or comparable excavation)*
		• *Low vapour pressure (LVP) or gas, any class location, any excavation (limited by PR):* ***0.80 m***
		• *HVP or CO_2 pipeline, Class 1 location:*
		  ▪ ***0.90 m****, CSA (normal excavation)*
		  ▪ ***0.80 m****, limited by PR (rock or comparable excavation)*
		• *HVP or CO_2 pipeline, Class 2,3,4 location:*
		  ▪ ***1.20 m****, CSA (normal excavation)*
		  ▪ ***0.80 m****, limited by PR (rock or comparable excavation)*
		• *Any other place (PR):* ***0.80 m***
		**Can be reduced to 0.80 m with analysis demonstrating erosion potential is minimized (allowed to 0.60 m under CSA, but limited to 0.80 m per PR).*

2.4 Crossings (Road/Railway/Water)

Manual #	Risk rating	Description
2.4.5.1	High Risk	Casing or thicker-walled pipe installed under a highway, road, or railway does not extend the full width of the ROW of the highway, road, or railway. (*Pipeline Rules* [18], [19]) *Note: This applies to both new construction and existing piping under new or modified highway, railway, or road upgrades.*
2.4.10.1	High Risk	Installation of cased or uncased crossings is not in accordance with *CSA Z662*. (*CSA Z662-15* [4.12.3.1], [4.12.3.2], [4.12.3.3], table 4.10, and [13.1.4.5])
2.4.15.1	Low Risk	Pipeline does not have a straight alignment or a consistent depth of cover for the full width of the utility ROW. (*CSA Z662-15* [4.12.2.1])
2.4.20.1	High Risk	Carrier or casing pipe used for open-cut crossings is not laid on suitable bedding material with an even-bearing throughout the length, or is not installed in a manner that prevents the formation of a waterway along them, or is not compacted to prevent settlement. (*CSA Z662-15* [6.2.10.2])

Manual #	Risk rating	Description
2.4.25.1	High Risk	Pipe is overstressed* during installation at a water crossing. (*CSA Z662-15* [6.2.10.4]) ▲ *Examples may include: pulling or bending stress. Overstresses may be determined by failure analysis.
2.4.30.1	High Risk	Inappropriate support and protection where reinforced composite pipe exits the casing and beyond the casing ends, to the main line ditch grade. (*CSA Z662-15* [13.1.4.6])
2.4.35.1	High Risk	Polyethylene pipe used in uncased road or railway crossing has a standard dimension ratio (SDR) greater than 11, or it is not well supported in a bore hole; or transitions between the bored pipe and line pipe are not well supported or compacted when backfilled. (*CSA Z662-15* [13.3.2.8])
2.4.40.1	High Risk	The hoop strength of an aluminum pipeline at an uncased railway crossing exceeds 25 per cent specified minimum yield strength (SMYS), or the pipe wall thickness is not in accordance with *CSA Z662-15*. (*CSA Z662-15* [15.3.5])

2.5 Horizontal Directional Drilling

Note: Inspections of drilling waste from horizontal directional drilling (HDD) are to be done using *Manual 002: Drilling Waste Inspections*, and any deficiencies are to be entered in FIS, sections 2.5.30.1 and 2.5.31.1.

Manual #	Risk rating	Description
2.5.5.1	High Risk	A written execution plan is not developed prior to HDD or the execution plan is not used during the completion of such drilling. (*CSA Z662-15* [4.22], [6.2.11.1]) *Note: The plan must include, as a minimum, drill bit directing and tracking equipment, workspace requirements, and environmental protection requirements.*
2.5.10.1	High Risk	Pipe handling and installation procedures during HDD do not minimize coating damage and stress to pipe. (*CSA Z662-15* [6.2.11.3])
2.5.15.1	High Risk	Evaluation of pipe and coating integrity during HDD does not include visual and nondestructive testing of girth welds, visual inspection of coating at the drillhole exit, and a pressure test of the drag section after pull back. (*CSA Z662-15* [6.2.11.4])
2.5.20.1	Low Risk	The hole diameter of the bored crossing is not as close as practical to the outside diameter of the carrier pipe or casing pipe. (*CSA Z662-15* [6.2.10.3(a)])
2.5.25.1	Low Risk	Prompt remedial measures were not taken when bored holes were abandoned or where the space between pipes and the hole is excessive. (*CSA Z662-15* [6.2.10.3(b)])
2.5.30.1	High Risk	High risk noncompliance items referenced from *Manual 002: Drilling Waste Inspections*. See the Field Inspection System (FIS) comments for details.
2.5.31.1	Low Risk	Low risk noncompliance items referenced from *Manual 002: Drilling Waste Inspections*. See FIS comments for details.

2.6 Design and Materials

Manual #	Risk rating	Description
2.6.5.1	High Risk	The wall thickness for steel pipe is less than the applicable value given in *CSA Z662-15*, table 4.5. (*CSA Z662-15* [4.3.11.2])
2.6.10.1	High Risk	Steel pipe is not made to a standard or specification given in table 5.3, except as allowed in *CSA Z662-15*. (*CSA Z662-15* [5.2.4]) *Note: If this noncompliance is observed, refer it to Authorizations for possible nonroutine engineering assessment (EA) approval. The material may be suitable; it just might be different than the material that was originally approved.*
2.6.15.1	High Risk	Steel fittings, flanges, and valves are not made to a standard or specification given in table 5.3, except as allowed in *CSA Z662-15*. (*CSA Z662-15* [5.2.5.1]).
2.6.20.1	High Risk	Valve, fitting, or another component connected to the pipeline does not have a manufacturer's rating that is equal to or greater than the maximum operating pressure authorized by the AER, or the pressure rating exceeds those specified in the applicable CSA material standard. (*Pipeline Rules* 15; *CSA Z662-15*, table 5.3)
2.6.25.1	High Risk	Flanges or fittings are not suitable for the grade of pipe to which they are to be joined. (*CSA Z662-15* [5.2.6.1], [5.2.9.1])
2.6.30.1	High Risk	Bends and elbows used for direction changes in steel piping are not made in accordance with *CSA Z662*. (*CSA Z662-15* [6.2.3])
2.6.35.1	High Risk	Anchors or ground restraints do not allow movement necessary to prevent stress or strain on partially restrained buried pipelines. (*CSA Z662-15* [4.7.3]) ▲
2.6.40.1	High Risk	Licensee did not provide flexibility of unrestrained portions of pipeline systems to absorb thermal strains (expansion and contraction) and prevent excessive stresses. (CSA *Z662-15* [4.7.3], [4.8.1], [4.8.2]) ▲
2.6.45.1	High Risk	Design pressure and wall thickness of field bends are not in accordance with the requirements for straight pipe. (*CSA Z662-15* [4.3.5.3])
2.6.50.1	Low Risk	Adequate protection to prevent damage to the piping from unusual or special external conditions is not provided. (*CSA Z662-15* [4.3.1.2]) *Example: Guard around a riser.*
2.6.55.1	High Risk	Construction drawing or document deviations for a sour service pipeline has been made without prior approval from the company, or without record of approval. (*CSA Z662-15* [16.5.1])
2.6.60.1	High Risk	Sour gas or sour multiphase pipeline is not designed to accommodate internal maintenance cleaning and inspection devices. (*CSA Z662-15* [16.9.2.2]) *Note: This is not practical in some instances, such as 2" flex pipe.*
2.6.65.1	High Risk	Pipeline material does not comply with the sour service clause of the applicable *CSA Z245* standard. (*CSA Z662-15* [16.4.2.1]) *Note: "Material" means pipe, components, and equipment that are part of the pipeline.*
2.6.70.1	High Risk	For sour service, the piping on both sides of anchored circumferential welds is not supported in accordance with *CSA Z662-15*. (*CSA Z662-15* [16.3.4]) ▲

Manual #	Risk rating	Description
2.6.75.1	Low Risk	Pipe and components intended for sour service are not properly marked. (*CSA Z662-15* [16.4.3.1], [16.4.3.2], [16.4.3.3])
2.6.80.1	High Risk	Field-fabricated mitred bends are used for polyethylene pipe. (*CSA Z662-15* [13.3.4.2])
2.6.85.1	High Risk	Threaded joints are used in aluminum piping. (*CSA Z662-15* [15.3.3.3])
2.6.90.1	High Risk	Threaded metallic pipe-to-pipe and pipe-to-component joints are used for permanently buried installations; for pipe larger than 114.3 mm OD; for pipe larger than 60.3 mm OD with an MOP > 3.5 MPa; or for piping in HVP or CO_2 service. (*CSA Z662-15* [4.5.2]) *Note: Permanently buried auxiliary joints such as drains, valve body bleeds, and instrument taps may be threaded directly into components.*
2.6.95.1	High Risk	The clearance in any direction between a pipeline and other structures (cables, conductors, other pipelines) does not meet the requirements in *CSA Z662-15*. (*CSA Z662-15* [4.11.2], table 4.9) *Note: Reduced clearance may be used if pipelines are appropriately protected from damage that could result from the pipeline being close to other structures.*

2.7 Materials, Handling, and Installation

Manual #	Risk rating	Description
2.7.5.1	High Risk	Pipe not supported to prevent excessive stresses and axial or lateral friction forces in the pipe. (*CSA Z662-15* [4.9.2.1]) ▲
2.7.10.1	High Risk	Nonwelded or welded pipe-supporting attachments to the pipe are not designed to minimize additional stresses in the pipe wall. (*CSA Z662-15* [4.10]) ▲
2.7.15.1	High Risk	External pressures and loadings on the pipe are not taken into account, or the pipe wall thickness is not of adequate strength to prevent excessive deformation and collapse. (*CSA Z662-15* [4.2.1.2]) ▲
2.7.20.1	High Risk	Piping does not reasonably follow the contour of the ditch, or external force used on pipe to make it fit the contour of the ditch causes stress to the pipe or damage to the coating. (*CSA Z662-15* [6.2.6.4])
2.7.25.1	High Risk	Coated pipe was not inspected for defects before backfilling. (*CSA Z662-15* [9.3.4])
2.7.30.1	High Risk	Care is not taken in the handling, transporting, stockpiling, and placing of pipe and components to prevent damage to the pipe, coating, and any lining. (*CSA Z662-15* [6.2.2])
2.7.35.1	High Risk	Pipeline weights are installed in a manner that damages the pipe or coating. (*CSA Z662-15* [6.2.6.5])
2.7.40.1	High Risk	The transportation, installation, and repair of pipeline reduced the wall thickness at any point to less than 90 per cent of the design wall thickness. (*CSA Z662-15* [6.1.3], [15.5.3.2])
2.7.45.1	Low Risk	Aluminum pipe ends are not covered or fittings are not protected during shipment or handling. (*CSA Z662-15* [15.5.3.3])
2.7.50.1	High Risk	Aluminum pipe installed either with a plough that is not designed to prevent damage to the pipe or with a plough shoe of an incorrect radius. (*CSA Z662-15* [15.5.5.1])
2.7.55.1	High Risk	Changes in direction of aluminum pipe when installed by ploughing are not in accordance with *CSA Z662*. (*CSA Z662-15* [15.5.5.3], [15.5.5.4])

Manual #	Risk rating	Description
2.7.60.1	High Risk	Sour service aluminum pipelines are not constructed in accordance with *CSA Z662*. (*CSA Z662-15* [15.10.8], [16.5])
2.7.65.1	Low Risk	A continuous, electrically insulated and minimum 14-gauge metallic tracer wire is not appropriately installed, or is not installed adjacent to each reinforced composite (RCP) or polyethylene (PE) pipeline. (*CSA Z662-15* [13.1.4.1], [13.3.4.1])
2.7.70.1	High Risk	PE pipe plough installation is bent to radii smaller than the minimum recommended by the manufacturer, or the bend causes buckles, cracks, or other damage. (*CSA Z662-15* [13.3.4.2], [13.3.4.3])
2.7.75.1	High Risk	Where PE pipe is cased, appropriate support and protection is not given where it exits the casing. (*CSA Z662-15* [13.3.4.4])
2.7.80.1	High Risk	Steel pipe, risers, valves, or other heavy components are not supported to prevent damage to reinforced composite pipe. (*CSA Z662-15* [13.1.2.13])
2.7.85.1	High Risk	The requirements are not met for above-ground reinforced composite, or for polyethylene piping that is joined to metallic piping or that is part of an above-ground piping system installation. (*CSA Z662-15* [13.1.2.14], [13.3.2.10]) *Note: This may include pipe support, anchoring, management of stresses, weather protection, fire, or mechanical damage.*
2.7.90.1	High Risk	Where reinforced composite pipe joins metallic piping below ground, required measures are not provided to prevent soil settlement at over-excavated areas at pipeline risers. (*CSA Z662-15* [13.1.2.15]) ▲

2.8 Welding (General and Procedures)

Manual #	Risk rating	Description
2.8.5.1	High Risk	The qualified weld procedure specification for preheating sour service pipeline was not followed. (*CSA Z662-15* [16.6.7])
2.8.10.1	Low Risk	The base material carbon equivalent used in procedure qualification was not captured in the procedure qualification record. (*CSA Z662-15* [16.6.1])
2.8.15.1	High Risk	Excessive force was used to align tie-in welds on sour service pipelines; e.g., track hoes, jack alls, come alongs etc. (*CSA Z662-15* [16.6.6])
2.8.20.1	High Risk	Welding hardness on sour service pipeline exceeds maximum allowable. (*CSA Z662-15* [16.6.4]) ▲
2.8.25.1	High Risk	Welding of piping does not use a qualified welding procedure. (*CSA Z662-15* [7.9.1.1])
2.8.30.1	Low Risk	Welding procedure not approved by the company. (*CSA Z662-15* [7.6.2])
2.8.35.1	Low Risk	Welding procedure qualification test and welding procedure are not being recorded or are not available during construction where the work is being done. (*CSA Z662-15* [7.6.3])
2.8.40.1	High Risk	Welding specification procedures are not requalified where essential changes* have occurred. (*CSA Z662-15* [7.6.5] table 7.3, [16.6.2]) **Essential changes in welding procedures require requalification of the welding procedure specification, or the establishment and qualification of a new welding procedure specification.*
2.8.45.1	High Risk	Welder not qualified for the specified company welding procedure or has not requalified within the required time interval. (*CSA Z662-15* [7.8.1.1])

Manual #	Risk rating	Description
2.8.50.1	High Risk	Pipe or components are aligned by hammering after welding of root bead has begun. (*CSA Z662-15* [7.9.2])
2.8.55.1	High Risk	Grounding device is welded to pipe or component. (*CSA Z662-15* [7.9.3])
2.8.60.1	High Risk	Welding was done during weather conditions that impaired the welding (e.g., moisture, blowing sand, high winds, low temperature) without mitigating the adverse effects (e.g., by using wind shields). (*CSA Z662-15* [7.9.7.1])
2.8.65.1	High Risk	Weld procedure was not qualified for stud welding (for the purpose of corrosion monitoring) in a heat-affected zone of a pipeline. (*CSA Z662-15* [9.10.3.2])

2.9 In-Service Welding and Weld Repairs

Manual #	Risk rating	Description
2.9.5.1	High Risk	Welds on in-service piping are not made using low-hydrogen welding practices or are not in accordance with *CSA Z662*. (*CSA Z662-15* [7.17.2.3]) *Note: Cellulosic electrodes may be used for the root pass on branch connection welds, provided the requirement of CSA Z662-15, clause 7.17.5.2 is met.*
2.9.10.1	High Risk	Weld imperfections (field circumferential welds or mill welds) found on in-service piping have not been subject to an engineering assessment and deemed acceptable, or have not been repaired using acceptable methods. (*CSA Z662-15* [10.10.6], [10.10.7])
2.9.15.1	High Risk	Before welding on in-service piping, the area to be welded was not inspected for adequate wall thickness and imperfections. (*CSA Z662-15* [10.13.2.3])
2.9.20.1	High Risk	Hot-tap weld procedures for joining run pipes to branches or reinforcement sleeves were not in accordance with a qualified weld procedure specification. (*CSA Z662-15* [10.14.3.1])
2.9.25.1	High Risk	Direct deposition welding was not done in accordance with the qualified weld procedure or with *CSA Z662*. (*CSA Z662-15* [10.11.6.2], [10.11.6.3])
2.9.30.1	High Risk	Finished direct deposit weld repair surface is not suitable for ultrasonic inspection or contoured to match the pipe surface profile. (*CSA Z662-15* [10.11.6.4])
2.9.35.1	High Risk	Direct deposit welding is being used to repair where not allowed by *CSA Z662*. (*CSA Z662-15* [10.11.6.1])
2.9.40.1	High Risk	Direct deposit welding repairs are being used on sour service pipelines. (*CSA Z662-15* [16.8.5])
2.9.45.1	High Risk	Ripples, wrinkles, and buckles that exceed the acceptable limits established in *CSA Z662 -15*, clause 10.10.8, were not removed in accordance with *CSA Z662-15*, clause 6.3.4.1. *Note: If this is observed and the licensee wishes to leave the ripple, wrinkle, or buckle in place rather than cut it out, refer to* CSA Z662-15, *clause 10.10.8.4, and consult with AER pipeline engineering personnel.*
2.9.50.1	High Risk	Pipe out of roundness does not fall within the limits set out in *CSA Z662-15* and was not removed. (*CSA Z662-15* [6.3.4.2]) Note: The difference between the maximum and minimum diameters of the pipe (pipe out of roundness) must not exceed 5% of the specified outside diameter of the pipe. This is applicable to mainline pipe, not girth weld joints.

Manual #	Risk rating	Description
2.9.50.1	High Risk	Cracks in circumferential or fillet welds have not been completely removed by cutting out as a cylinder and replacing with a pipe as necessary in accordance with *CSA Z662-15*, clause 10.11.3(b), or by using a repair procedure* as specified in *CSA Z662-15*, clause 7.12.5. (*CSA Z662-15* [6.3.5]) ▲ ** Field inspectors are to consult with AER pipeline engineering personnel or the AER pipeline technical specialist when dealing with repairs to welds containing cracks, as allowed in CSA Z662-15, clause 7.12.5.*
2.9.55.1	High Risk	Repair of welds that had repairable defects was not done in accordance with *CSA Z662*. (*CSA Z662-15* [7.12]) ▲

2.10 Mechanical Interference Fit Joints

Manual #	Risk rating	Description
2.10.5.1	High Risk	No mechanical interference fit joining procedure specifications, or specifications are not supported by engineering test data or field trials. (*CSA Z662-15* [7.16.2.1])
2.10.10.1	High Risk	Mechanical interference fit joining operators not qualified to produce acceptable, consistent joints or not qualified to properly prepare pipe ends for joining. (*CSA Z662-15* [7.16.3.1], [7.16.3.2])
2.10.15.1	High Risk	Inspection procedures for mechanical interference fit joints are not approved and implemented by the company or do not include the required inspection criteria in accordance with *CSA Z662*. (*CSA Z662-15* [7.16.4.1])
2.10.20.1	High Risk	Mechanical interference fit joints were used to join pipeline* licensed for sour service. (*CSA Z662-15* [16.10.2]) ** Gas pipelines only.*
2.10.25.1	High Risk	Sleeve, coupled, mechanical interference fit, and other patented joints are used in HVP or CO_2 pipeline systems. (*CSA Z662-15* [4.5.3.1])
2.10.30.1	High Risk	Sleeve, coupled, mechanical interference fit, and other patented joints when used* in LVP pipeline systems are not in accordance with *CSA Z662*. (*CSA Z662-15* [4.5.3.2]) **Sleeve, coupled, mechanical interference fit, and other patented joints can be used in metallic LVP pipeline systems provided:* *(a) the materials are qualified as specified in clause 5.1;* *(b) a sample of the type of joint to be used has been proof tested under simulated service conditions incorporating anticipated vibration, cyclic operation, low temperature, thermal expansion, and other such conditions; and* *(c) adequate provision is made to prevent separation of the joint as a result of longitudinal or lateral movement that would exceed the capability of the joining members.*
2.10.35.1	High Risk	Mechanical interference fit joints are installed in a gas pipeline system that is not in a Class 1 location.* (*CSA Z662-15* [4.5.3.3]) **See CSA Z662-15, table 4.1, Class Locations and Designations*

2.11 Aluminum Joining and Inspection

Manual #	Risk rating	Description
2.11.5.1	High Risk	All circumferential joints of aluminum pipe within a railway ROW are not nondestructively inspected (i.e., radiographically inspected for 100% of their circumference). (*CSA Z662-15*, [15.3.5])
2.11.10.1	High Risk	Qualifications of high-energy-joining personnel are not in accordance with *CSA Z662*. (*CSA Z662-15* [15.6.5])
2.11.15.1	High Risk	High energy joining was not done in accordance with a qualified joining procedure specification, or the joining procedure specifications are not in accordance with *CSA Z662*. (*CSA Z662-15* [15.6.4], [15.6.7.1])
2.11.20.1	High Risk	Nondestructive inspection of high energy joining was not in accordance with *CSA Z662*. (*CSA Z662-15* [15.6.6.1])
2.11.25.1	High Risk	Destructive testing of high energy joining was not in accordance with *CSA Z662*. (*CSA Z662-15* [15.6.6.2])
2.11.30.1	High Risk	High energy joints were not visually inspected in accordance with *CSA Z662*, or results and records were not kept. (*CSA Z662-15* [15.6.8.2])
2.11.35.1	High Risk	High energy joints that are unacceptable on the basis of the requirements of clause 15.6.6.1 are not removed as a cylinder. (*CSA Z662-15* [15.6.8.3])
2.11.40.1	High Risk	Aluminum pipeline butt welds in sour service were not radiographically inspected for 100% of their circumference. (*CSA Z662-15* [15.10.6.1])
2.11.45.1	High Risk	Aluminum pipeline high energy joints in sour service were not ultrasonically inspected for 100% of their circumference. (*CSA Z662-15* [15.10.6.2])

2.12 Nonmetallic Joining

Manual #	Risk rating	Description
2.12.5.1	High Risk	Personnel are not competent at installing couplings or components in accordance with manufacturer's recommended practice, or couplings and components were not being installed in accordance with manufacturer's recommended practice. (*CSA Z662-15* [13.1.4.3])
2.12.10.1	High Risk	Production joints were not made in accordance with a documented reinforced composite pipe joining procedure that is based on the manufacturer's joining recommendations. (*CSA Z662-15* [13.1.5.1])
2.12.15.1	High Risk	The company did not ensure that the personnel performing the joining are qualified and competent in the reinforced composite pipe joining procedure. (*CSA Z662-15* [13.1.6]) ***Note: Personnel performing the joining procedure should be able to produce documentation that they are qualified to conduct the procedure.***
2.12.20.1	High Risk	Reinforced composite pipe systems are not joined using an acceptable method in accordance with *CSA Z662*. (*CSA Z662-15* [13.1.5.2]) ***Note: If joins are not cathodically protected, an engineering assessment must be done.***
2.12.25.1	High Risk	For reinforced composite pipe to steel pipe transitions that use threaded or adhesive-bonded tapered connections, steel does not form the outside portion of the connection. (*CSA Z662-15* [13.1.5.4])

Manual #	Risk rating	Description
2.12.30.1	High Risk	Polyethylene pipe and fittings are not joined by heat fusion or special fittings or flanges, or polyethylene pipe and steel pipe were not joined using manufacturer-approved special transition fittings or flanges. (*CSA Z662-15* [13.3.5.1])
2.12.35.1	High Risk	Polyethylene pipe is joined using threaded connections. (*CSA Z662-15* [13.3.5.2])
2.12.40.1	High Risk	Joining procedure for polyethylene pipe does not incorporate provisions for field conditions or adjustments required for different ambient temperatures. (*CSA Z662-15* [13.3.5.4])
2.12.45.1	High Risk	The fusion joining procedure for high density polyethylene (HDPE) pipe was not in accordance with *CSA Z662*. (*CSA Z662-15* [13.3.5.3])
2.12.50.1	High Risk	Failure to follow the requirements as stated in *CSA Z662-07*, clause 13.3 for the fusion joining, installation, and quality verification of HDPE pipe. (*Directive 077* [4.2]) *Note: This noncompliance refers to the use of high performance high density polyethylene (PE80 and PE100) in oil and gas services as specified in Directive 077.*
2.12.55.1	Low Risk	HDPE fusion joining parameters for each joint were not accurately recorded,* maintained within the joining procedure, and maintained for the life of the pipeline. (*CSA Z662-15* [13.3.7.7]) **Refer to clause 13.3.7.7 for a list of minimum fusion joining parameters to be recorded (manually or electronically).*
2.12.60.1	High Risk	Either procedures for field destructive testing and visual assessment of HDPE pipelines, or the bend test procedure used for fusion joint testing were not in accordance with *CSA Z662*. (*CSA Z662-15* [13.3.7.5], [13.3.7.6])
2.12.65.1	High Risk	Test sample requirements for HDPE pipelines were not completed in accordance with *CSA Z662*. (*CSA Z662-15* [13.3.7.8], [13.3.7.9])
2.12.70.1	High Risk	Quality control of heat fusion joints was not done in accordance with an inspection and test plan that is in accordance with *CSA Z662*. (*CSA Z662-15* [13.3.7.1])
2.12.75.1	Low Risk	Records of results of fusion joint testing were not maintained for the life of the pipeline, or pipe test samples were not saved until project completion. (*CSA Z662-15* [13.3.7.2])
2.12.80.1	High Risk	Proper testing procedures for HDPE pipe were not followed where a fusion joint test failure has occurred. (*CSA Z662-15* [13.3.7.3], [13.3.7.4])
2.12.85.1	High Risk	Reinforced composite pipe is bent to radii smaller than the minimum recommended by the manufacturer. (*CSA Z662-15* [13.1.4.8]) Note: Bends must be free from buckles, cracks and other evidence of damage. Field-fabricated mitred bends shall not be used.
2.12.90.1	High Risk	Bend radii and relative diameters of reinforced composite pipe installed as a liner in a steel pipe are not done in accordance with the manufacturer's recommendations. (*CSA Z662-15* [13.1.4.7])

2.13 Joining Inspections

Manual #	Risk rating	Description
2.13.5.1	High Risk	Production welds that are not nondestructively tested have not been visually inspected. (*CSA Z662-15* [7.10.1.2])
2.13.10.1	High Risk	Welds inspected using ultrasonic methods were not also visually inspected. (*CSA Z662-15* [7.10.1.3])

Manual #	Risk rating	Description
2.13.15.1	High Risk	Completed welds were not visually inspected for 100% of their length and in accordance with the company's procedures. (*CSA Z662-15* [7.10.2.1])
2.13.20.1	Low Risk	The visual inspection results of completed production welds were not reported in the company's format, or reports of defective welds did not contain the required information. (*CSA Z662-15* [7.10.2.3])
2.13.25.1	High Risk	All welds within the limits of uncased road, railway crossings, water crossings, pressure-retaining welds that will not be pressure tested in place, and a minimum of 15% of all other production welds made each day were not nondestructively inspected for 100% of their length. (*CSA Z662-15* [7.10.3.1])
2.13.30.1	High Risk	All butt welds in CO_2 pipelines were not inspected (radiographic or ultrasonic methods) for 100% of their circumference. (*CSA Z662-15* [7.10.3.2])
2.13.35.1	High Risk	Partial penetration butt welds are not radiographically inspected for 100% of their circumference. (*CSA Z662-15* [7.10.3.3])
2.13.40.1	Low Risk	Ultrasonic evaluation records are not kept until the piping is abandoned, or inspection records, calibration records, and log books are not kept for a minimum of two years. (*CSA Z662-15* [7.15.11.5])
2.13.45.1	High Risk	Nondestructive testing of welds made on in-service piping was not done using appropriate inspection methods. (*CSA Z662-15* [7.17.7.1])
2.13.50.1	High Risk	The company has not developed or provided a construction inspection plan for sour service pipelines to the contractor, or the contractor has not used the plan. (*CSA Z662-15* [16.5.3])
2.13.55.1	High Risk	Sour service production or tie-in welds were not nondestructively tested for 100% of their circumference. (*CSA Z662-15* [16.9.3.2])
2.13.60.1	High Risk	Incomplete penetration or incomplete fusion is identified in sour service pipeline girth welds and is not repaired or removed in accordance with clause 7.12.6.1. (*CSA Z662-15* [16.9.3.3])

2.14 Installation of Liners and Nonmetallic Pipe

Manual #	Risk rating	Description
2.14.5.1	Low Risk	Polymeric or fibre-reinforced composite pipe was installed as a free-standing liner or free-standing pipe for the purpose of conveying more than 1% H_2S (10 mol/kmol) of natural gas without approval of the AER. (*Pipeline Rules* 11)
2.14.10.1	High Risk	Liner was installed in a sour service pipeline where the hoop strength of the exterior pipeline was not in accordance with *CSA Z662-15* and the *Pipeline Rules*. (*Pipeline Rules* 73)
2.14.15.1	High Risk	Lined flanged joints were not assembled in accordance with the liner installer's procedure. (*CSA Z662-15* [13.2.6.1])
2.14.20.1	High Risk	The circumferential welds made to install steel flanges that did not undergo a pressure test prior to liner insertion were not radiographically inspected for 100% of their circumferences. (*CSA Z662-15* [13.2.6.3]) *Note: Carrier pipe must be tested prior to liner insertion. A company can test the entire line and, depending on the length of the liner pulls, cut the pipe and install flanges. They would then be allowed to radiographically inspect the circumferential welds for the flanges.*
2.14.25.1	High Risk	Fittings to facilitate venting of annulus between the liner and the carrier pipe were not installed as recommended by the liner installer or manufacturer. (*CSA Z662-15* [13.2.2.7])

Manual #	Risk rating	Description
2.14.30.1	High Risk	Before liner insertion, a sizing pig was not run in the thermoplastic-lined pipeline to ensure the internal diameter was unobstructed and suitable for the liner to be installed without damage. (*CSA Z662-15* [13.2.4.1])
2.14.35.1	High Risk	A thermoplastic-lined pipeline was not internally cleaned and pigged free of fluid before liner insertion. (*CSA Z662-15* [13.2.4.2])
2.14.40.1	High Risk	After liner insertion, the part of the liner that is visible at the exit point was not inspected; or mechanical damage to the visible liner after installation exceeds manufacturer's recommendations or is deeper than 5% of the nominal wall thickness. (*CSA Z662-15* [13.2.4.3])
2.14.45.1	High Risk	Where reinforced composite or PE pipe is installed as a free-standing liner, the bend radii and relative diameters are not in accordance with manufacturer's specifications. (*CSA Z662-15* [13.3.2.9])
2.14.50.1	High Risk	The company did not ensure that the personnel performing the joining of liners are competent in the joining procedure. (*CSA Z662-15* [13.2.5.2])
2.14.55.1	High Risk	Before the liner was inserted, excess external fusion bead on the liner was not trimmed using proper equipment or procedures prescribed by the liner installer. (*CSA Z662-15* [13.2.5.3])

2.15 Licensee Inspections (Quality Control)

Note: This section identifies inspections required by the licensee for quality control, and reflects the timeframe from the receipt of materials (including prefabricated assemblies) to the completion of installation.

Manual #	Risk rating	Description
2.15.5.1	Low Risk	Piping defect inspections were not conducted immediately prior to the application of field-applied coatings, during lowering-in, and during backfilling operations. (*CSA Z662-15* [6.5.3])
2.15.10.1	Low Risk	Pipe and components were not inspected for defects such as pipe deformation, damage, and defective welds. (*CSA Z662-15* [6.5.4])
2.15.15.1	High Risk	Bends were not inspected for conformance with *CSA Z662-15,* clause 6.2.3. (*CSA Z662-15* [6.5.5])
2.15.20.1	Low Risk	Field-coated pipe was not inspected for defects caused by the cleaning/coating machine. (*CSA Z662-15* [6.5.6])
2.15.25.1	Low Risk	Plant-applied coatings were not inspected for integrity immediately after field bending. (*CSA Z662-15* [6.5.8])
2.15.30.1	High Risk	For corrosion-resistant lining, the lining inside each pipe end was not visually inspected for damage prior to joining, or damaged lining was not repaired in accordance with the manufacturer's specifications, or the damaged section was cut out. (*CSA Z662-15* [6.5.9])
2.15.35.1	Low Risk	Pipe repairs, replacement, or alterations were not inspected prior to backfilling. (*CSA Z662-15* [6.5.11])
2.15.40.1	Low Risk	Nonwelded tie-in joints were not visually inspected during initial pressurization. (*CSA Z662-15* [8.12.2])
2.15.45.1	High Risk	The company does not have documented procedures for conducting inspections to ensure that the requirements of *CSA Z662-15* are met. (*CSA Z662-15* [6.5.2.1], [6.5.2.2])

3 Ground Disturbance

3.1 General

Manual #	Risk rating	Description
3.1.5.1	High Risk	Licensee is not registered with Alberta One Call or does not register every pipeline with Alberta One call regardless of operational status. (*Pipeline Rules* 59[a])
3.1.10.1	High Risk	Licensee does not register the pipeline with Alberta One Call before putting it into operation. (*Pipeline Rules* 59[b])
3.1.15.1	High Risk	A person proposing to disturb the ground did not take all precautions reasonably necessary to check for pipelines within 30 m of the perimeter of the ground disturbance area. (*Pipeline Act* 32[1], *Pipeline Rules* 60[1])
3.1.20.1	High Risk	A person proposing to disturb the ground within the controlled area of a pipeline did not notify the licensee and Alberta One call. (*Pipeline Rules* 60[2])
3.1.25.1	High Risk	The licensee did not provide a person who is disturbing or proposing to disturb the ground with the requested information (i.e., records). (*Pipeline Act* 32[2])
3.1.30.1	High Risk	A pipeline licensee that may be, or is, affected by a ground disturbance did not provide reasonable assistance to a person who is disturbing or proposing to disturb the ground. (*Pipeline Act* 32[3])
3.1.35.1	Low Risk	The licensee did not respond in writing within 21 days of the date the licensee requested approval for a ground disturbance. (*Pipeline Rules* 62[1])
3.1.40.1	High Risk	Ground is disturbed in a pipeline ROW without approval of the licensee or the AER. (*Pipeline Act* 42)
3.1.45.1	High Risk	Ground is disturbed within 5 m of a pipeline with no ROW without the written approval of the pipeline licensee (within 21 days of the date of approval request), or of the AER if approval cannot be reasonably obtained from the licensee. (*Pipeline Rules* 58, 62[1])
3.1.50.1	High Risk	Unless otherwise agreed to by the parties, identifying and marking is not completed within two working days (excluding Saturdays, Sundays, and holidays) after the licensee has been notified of the proposed ground disturbance. (*Pipeline Rules* 60[3])
3.1.55.1	High Risk	A notified licensee does not, prior to commencement of the ground disturbance, accurately mark the horizontal position and alignment of the pipeline with distinct warning signs and markers at adequate intervals in accordance with the uniform colour code, and provide documentation of the markings to the person proposing the ground disturbance. (*Pipeline Rules* 60[4])
3.1.60.1	High Risk	A person proceeded to disturb the ground within the controlled area before locating and marking of the pipeline. (*Pipeline Rules* 60[5])
3.1.65.1	Low Risk	A person proposing a ground disturbance identifies and marks a pipeline without either permission or delegation of the responsibility from the licensee. (*Pipeline Rules* 60[6])
3.1.70.1	High Risk	Alternative methods of locating and marking a pipeline were used but were not agreed to by the licensee and the person proposing to disturb the ground. (*Pipeline Rules* 60[7])
3.1.75.1	High Risk	A pipeline licensee who has been notified of a ground disturbance did not have a representative inspect the pipeline before the ground disturbance began, or the representative did not ensure that the pipeline had been properly identified and marked (as per *Pipeline Rules* 60[4]). (*Pipeline Rules* 63[1][a])

Manual #	Risk rating	Description
3.1.80.1	Low Risk	A pipeline licensee who has been notified of a ground disturbance did not ensure that its representative had in his or her possession when on the site of the ground disturbance a copy of the written approval for the ground disturbance. (*Pipeline Rules* 63[1][b])
3.1.85.1	High Risk	A pipeline licensee who has been notified of a ground disturbance did not ensure that its representative has completed a supervisory-level training course in ground disturbance practices and is currently certified to supervise a ground disturbance. (*Pipeline Rules* 63[1][c])
3.1.90.1	High Risk	A pipeline licensee who has been notified of a ground disturbance did not inspect the ground disturbance as necessary to ensure the continued safety of the pipeline. (*Pipeline Rules* 63[1][d])
3.1.95.1	High Risk	The person responsible for a ground disturbance did not keep all pipeline warning signs or markers visible and legible for the duration of the ground disturbance or did not replace or relocate them if necessary. (*Pipeline Rules* 63[2])
3.1.100.1	High Risk	A person who is disturbing ground and who exposes any part of a pipeline did not notify the licensee at least 24 hours before backfilling the pipeline. (*Pipeline Rules* 63[3])
3.1.105.1	High Risk	A licensee notified of a pipeline being exposed during a ground disturbance did not inspect the exposed part of the pipeline for damage before backfilling. (*Pipeline Rules* 63[3])
3.1.110.1	Low Risk	A licensee does not keep a record of any inspections conducted under subsection 63[3] for two years from the date the record was made, and does not submit a copy of the record to the AER on request. (*Pipeline Rules* 63[4])
3.1.115.1	High Risk	Upon request of the AER, a licensee does not protect, operate at a reduced pressure, or depressurize a pipeline adjacent to a ground disturbance in the controlled area of a pipeline. (*Pipeline Rules* 64)
3.1.120.1	High Risk	Excavation conducted for the purpose of locating a pipeline was not done by hand excavation* until the pipeline was sufficiently exposed to enable it to be identified. (*Pipeline Rules* 65[1]) **Means excavation of a pipeline or part of a pipeline by hand and includes excavation by water or air jets and, if the pipeline is more than 1.5 m below the surface of the ground, excavation by a combination of hand and mechanical means in accordance with the procedure set out in Schedule 3. (Pipeline Rules 1[1][n])*
3.1.125.1	High Risk	A representative of the licensee is not present* when the pipeline was exposed. (*Pipeline Rules* 65[2]) **Unless agreed to by the licensee and the person disturbing the ground.*
3.1.130.1	High Risk	An existing pipeline within 5 m of a proposed ground disturbance was not located by hand excavation*, or the hand excavation procedures are not acceptable to the licensee of the pipeline. (*Pipeline Rules* 65[3], 65[4]) ** See definition for hand excavation. (Pipeline Rules 1[1][n])*
3.1.135.1	High Risk	Mechanical excavation equipment used within 600 mm of a pipeline, or within any distance beneath a pipeline, is not under the direct supervision of a representative of the licensee of the existing pipeline. (*Pipeline Rules* 65[5])
3.1.140.1	High Risk	The exposure intervals along a pipeline (for ground disturbance parallel to and within 5 m of a pipeline) are not as required by licensee or AER direction. (*Pipeline Rules* 65[7])

Manual #	Risk rating	Description
3.1.145.1	Low Risk	A pipeline was crossed (outside of a travelled and upgraded portion of road) with a vehicle or equipment without prior licensee approval.* (*Pipeline Rules* 66) ** See vehicle exceptions for farming operations, and as defined as off-highway and private passenger (<3/4 ton chassis) in the Traffic Safety Act.*
3.1.150.1	Low Risk	Temporary crossings were not suitably prepared or used to protect a pipeline from damage. (*CSA Z662-15* [10.6.4.4])
3.1.155.1	High Risk	A licensee charged a party undertaking a ground disturbance a fee to locate and mark a pipeline, do inspections, or supervise a ground disturbance. (*Pipeline Rules* 67)

4 Pipeline Pressure Testing

4.1 General

Manual #	Risk rating	Description
4.1.5.1	High Risk	Pipeline is in service before a successful pressure test has been done as prescribed in the *Pipeline Rules* and *CSA*. (*Pipeline Act* 16[2], *Pipeline Rules* 23[a])
4.1.10.1	High Risk	Testing or pretesting of additional piping used to tie in the completed piping was not done before putting line in service. (*CSA Z662-15* [8.12.1])
4.1.15.1	High Risk	Before pressure testing of existing piping, an engineering assessment (EA) was not done to determine whether the piping can sustain the proposed test pressure and to establish pressure test limits so testing does not adversely affect pipe integrity. (*CSA Z662-15* [10.3.9.1])
4.1.20.1	High Risk	Where an engineering assessment has deemed it inappropriate, pressure testing was still conducted as specified in clause 8. (*CSA Z662-15* [10.3.9.3]) *Note: This would be for situations when pressure testing in accordance with clause 8 may cause unnecessary damage and impact; and the EA limits the test to protect the pipeline.* *(There could also be variances to clause 8, provided the EA has deemed them appropriate.)*
4.1.25.1	Low Risk	A leak test was not performed on piping and fabricated assemblies that were not considered completely accessible for visual inspection,* immediately subsequent to a strength test (minimum pressure of 110% MOP, and as specified in clause 8.2.5). (*CSA Z662-15* [8.7.1.2]) **Piping and fabricated assemblies with any insulation, concrete coating, or other types of coatings are not considered completely accessible for the purposes of a visual inspection.*
4.1.30.1	High Risk	A pipeline is tested at a pressure that causes a hoop stress greater than 100% SMYS, and the licensee did not develop a test procedure or did not plot a pressure-volume curve starting at no greater than 80% SMYS of the pipe. (*Pipeline Rules* 32[b], [c], *CSA Z662-15* [8.6.1])
4.1.35.1	High Risk	Requirements of *Directive 077*, section 6, and any applicable criteria under *Pipeline Rules* 35[1][b] are not followed when a medium other than fresh water is used. (*Pipeline Rules* 35[1])

Manual #	Risk rating	Description
4.1.40.1	High Risk	No contingency plan* for environmental protection is developed as required under *CSA Z662-15* when a liquid test medium other than fresh water is used and or when the medium otherwise does not meet any criteria under *Pipeline Rules* 35[1][b]. (*Pipeline Rules* 35[2]) * *See CSA Z662-15, clause 8.7.2.2*
4.1.45.1	High Risk	Except as otherwise allowed* in *CSA Z662*, liquid or gas pressure-test mediums (other than water) were used. (*CSA Z662-15* [8.7.2.1]) **See CSA Z662-15, clauses 8.7.2.2 and 8.7.2.3*
4.1.50.1	High Risk	Flammable gas, fluids, or gas containing H_2S, HVP liquids, or CO_2 in the liquid or quasi-liquid state, has been used as a pressure-test medium. (*Pipeline Rules* 39, *CSA Z662-15* [8.7.2.4])
4.1.55.1	High Risk	Licensee has not taken precautions to minimize the adverse effects on the environment when disposing of pressure-test medium. (*CSA Z662-15* [8.10])
4.1.60.1	High Risk	For aluminum piping, the test medium used is not in accordance with *CSA Z662*. (*CSA Z662-15* [15.7.2], [15.7.3])
4.1.65.1	High Risk	The pressure-test medium of a reinforced composite pipe is not air, water, or water with freezing point depressant, as appropriate. (*CSA Z662-15* [13.1.8.2])
4.1.70.1	High Risk	The maximum test pressure of reinforced composite pipe with air exceeded 2900 kPa. (*CSA Z662-15* [13.1.8.2])

4.2 Pressure and Duration

Manual #	Risk rating	Description
4.2.5.1	High Risk	Minimum strength-test and leak-test pressures are not met during testing, as per *CSA Z662*. (*CSA Z662-15* [8.7.3.1], table 8.1)
4.2.10.1	High Risk	Pipeline tested below 700 kPa without approval from the AER or tested less than 1.4 times the MOP for pipelines conveying gas containing more than 10 mol/kmol H_2S gas. (*CSA Z662-15* [8.8.3.1], *Pipeline Rules* 34)
4.2.15.1	High Risk	Steel piping in compressor stations, gas pressure-regulating stations, and gas measuring stations was not strength tested to the required pressure or duration. (*CSA Z662-15* [8.7.6.2], table 8.1)
4.2.20.1	High Risk	Steel piping in HVP service in pump stations, tank farms, and terminals was not strength tested to the required pressure or duration (CSA Z662-15 [8.7.6.3], table 8.1)
4.2.25.1	High Risk	Strength test pressure on the pipeline or components exceeds test pressure allowed in the applicable standard. (*CSA Z662-15* [8.7.4.1])
4.2.30.1	High Risk	Leak test pressure using liquid medium exceeds 100% SMYS. (*CSA Z662-15* [8.7.4.4])
4.2.35.1	High Risk	No leak test or leak test pressure exceeds the test pressure specified in the applicable material standard on any component in the test section on pipe being operated at 700 kPa or less. (CSA Z662-15 [8.8.4.1])
4.2.40.1	High Risk	Leak test pressure exceeds 1400 kPa on piping operated 700 kPa or less. (*CSA Z662-15* [8.8.4.2])

Manual #	Risk rating	Description
4.2.45.1	High Risk	Strength, leak, or concurrent test does not meet the minimum duration in accordance with *CSA Z662-15* (4 hr strength and 4 hr leak for liquid test medium; 24 hr for gaseous test medium). (*CSA Z662-15* [8.7.5.1], [8.7.5.3], [8.7.5.4], [8.8.5.1]) *Note: For pipe intended to be operated at pressures less than 700 kPa.*
4.2.50.1	High Risk	A pipeline less than 75 m in length, or a pipeline permanently located above ground, is not tested for a minimum of one hour. (*Pipeline Rules* 40[1], *CSA Z662-15* [8.7.5.2]) *Note: In exceptional circumstances, a licensee may apply to the AER to pressure test a pipeline or section of a pipeline other than one referred to in section 40[1] for a period shorter than the minimum specified in CSA Z662-15. (Pipeline Rules 40[2])*
4.2.55.1	Low Risk	AER approval was not obtained for testing with a gaseous test medium with an internal volume greater than 125 cubic metres. (*Pipeline Rules* 36[1])
4.2.60.1	High Risk	AER approval was not obtained for testing with a gaseous test medium on a pipeline where there are known or suspected conditions that could potentially cause the pipeline to break during testing. (*Pipeline Rules* 36 [2])

4.3 Records and Accuracy

Manual #	Risk rating	Description
4.3.5.1	Low Risk	No records, or incomplete records, of a failed pressure test. (*CSA Z662-15* [8.7.7.5], [8.7.7.6], [8.8.7.4])
4.3.10.1	Low Risk	No records, or improper records, of a successful pressure test. (*CSA Z662-15* [8.7.7.6], [8.8.7.5], [10.4.5]) *Note: If evidence of satisfactory testing is not provided to the AER on request, the AER may order that the pipeline be pressure tested in accordance with Pipeline Rules 30.*
4.3.15.1	Low Risk	Pressures during testing are not accurately recorded and identified by recording equipment. (*CSA Z662-15* [8.7.7.2])
4.3.20.1	Low Risk	Licensee's record or chart of a pressure test was not continuous or legible over the full test period, or the commencement and termination points were not identified. (*Pipeline Rules* 29[1])
4.3.25.1	Low Risk	Electronic pressure-recording instruments are not used in accordance with the *Pipeline Rules*. (*Pipeline Rules* 29[2])
4.3.30.1	Low Risk	Pressure-test readings are not within 25% to 90% of full instrument range. (*Pipeline Rules* 29[3])
4.3.35.1	Low Risk	Pressure recording instrument range was not recorded on the chart face or on the permanent paper copy of the test data. (*Pipeline Rules* 29[4])
4.3.40.1	Low Risk	The accuracy of the chart recorder was not verified before and after each pressure test, or the accuracy of the other test instruments was not verified periodically. (*Pipeline Rules* 29[5], *CSA Z662-15* [8.7.7.3], [8.8.7.3]) *Note: The accuracy of the chart recorder does not need to be verified through calibration of the recorder before and after each use. The accuracy can be verified against another device.*
4.3.45.1	Low Risk	No temperature recorder, or not measuring ambient temperature of test medium or pipe. (*CSA Z662-15* [8.7.7.4])

4.4 Safety

Manual #	Risk rating	Description
4.4.5.1	High Risk	Pipeline was not buried with earth cover to full depth before pressure testing. (*Pipeline Rules* 25)
4.4.10.1	Low Risk	Licensee did not conduct a pressure test in a manner that ensures the protection of persons and property in the vicinity of the pipeline. (*Pipeline Rules* 26)
4.4.15.1	High Risk	Suitable measures were not taken to keep unauthorized persons out of the area, or to eliminate ignition sources, during testing with a gaseous medium (*CSA Z662-15* [8.2.2])
4.4.20.1	High Risk	Licensee did not close the road or railway crossing during pressure testing where test pressures will exceed 80% or greater SMYS using gaseous medium testing. (*CSA Z662-15* [8.7.1.4])
4.4.25.1	High Risk	Test pressure of the pipeline within 20 m of the connection with the test head assembly would result in a hoop stress level greater than 90% of the SMYS. (*Pipeline Rules* 33)
4.4.30.1	High Risk	The pressure of the test head assembly during testing produced hoop stresses in excess of 75% of the SMYS of any pipe or fitting or was higher than the cold working pressure of any flange or valve in the test head assembly. *(CSA Z662-15* [8.5.1]*)*

4.5 Testing of Liners and Nonmetallic Pipe

Manual #	Risk rating	Description
4.5.5.1	High Risk	Newly constructed steel carrier pipeline not pressure tested immediately prior to liner installation. (*CSA Z662-15* [13.2.2.10]) *Note: Does not apply to free-standing liners.*
4.5.10.1	High Risk	Mechanical integrity of previously in-service steel carrier pipeline to be lined has not been proven in accordance with *CSA Z662*. (*CSA Z662-15* [13.2.2.12]) *Note: Does not apply to free-standing liners.*
4.5.15.1	High Risk	Thermoplastic liner pressure test is not in accordance with *CSA Z662-15* following insertion or after repairs. (*CSA Z662-15* [13.2.7.1], [13.2.8.5])
4.5.20.1	Low Risk	Annulus vents have not been periodically monitored, during pressure testing of thermoplastic lined pipelines, for build up or flow of liquids. (*CSA Z662-15* [13.2.7.2])
4.5.25.1	High Risk	Pressure test of PE pipeline was not in accordance with *CSA Z662*. (*CSA Z662-15* [13.3.8.1])
4.5.30.1	Low Risk	Tie-in joints on PE pipeline were not tested for at least one hour at the highest available operating pressure, or follow-up leak detection is not conducted as required. (*CSA Z662-15* [13.3.8.2])
4.5.35.1	High Risk	Maximum test pressure of PE pipelines exceeds manufacturer's recommendation. (*CSA Z662-15* [13.3.8.3])
4.5.40.1	High Risk	Improper test medium, or test medium using air exceeds 2900 kPa for RCP. (*CSA Z662-15* [13.1.8.2])
4.5.45.1	High Risk	Test pressure of RCP exceeds manufacturer's specifications and recommendations (*CSA Z662-15* [13.8.8.3])
4.5.50.1	High Risk	The minimum test pressure of RCP is not at least 125% of the intended design pressure. (*CSA Z662-15* [13.1.8.4])

Manual #	Risk rating	Description
4.5.55.1	High Risk	RCP pressure test durations were not in accordance with *CSA Z662-15*. (*CSA* [13.1.8.5])
4.5.60.1	Low Risk	RCP 1-hr visual pressure test at the highest available operating pressure after completed tested segments have been joined by a flanged connection or approved mechanical coupler is not completed in accordance with *CSA Z662*. (*CSA Z662-15* [13.1.8.7]) *Note: Refer to the CSA Commentary for explanation.*
4.5.65.1	High Risk	RCP maximum temperature during pressure testing exceeded the pipeline design temperature rating or the manufacturer's maximum recommended operating temperature. (*CSA Z662-15* [13.1.9.2]) *Note: Inspector must consider which temperature was used as the limiting factor in the pressure design.*

5 Operations and Maintenance

5.1 Operations Manuals and Procedures

Note: Safety and loss management systems (*CSA Z662-15* [3.1], [3.2]) and pipeline integrity management programs (*CSA Z662-15*, annex N) are required; however, they are not part of this manual.

Manual #	Risk rating	Description
5.1.5.1	High Risk	Licensee does not have a manual containing procedures for pipeline operation, corrosion control, integrity management, maintenance and repair, or does not provide the manuals to the AER upon request. (*Pipeline Rules* 7[1], *CSA Z662-15* [9.1.3], [10.5.1.1], [10.5.1.2])
5.1.10.1	Low Risk	The licensee does not have provisions for evaluation and mitigation of stress corrosion cracking when the licensed pipeline has disbonded or nonfunctional external coatings. (*Pipeline Rules* 7[2]) *Note: Stress corrosion cracking issues are typically found in larger diameter transmission lines with cumulative environmental stresses (e.g., higher SMYS %, CP, temperature, etc.). This may not apply to smaller diameter pipeline systems.*
5.1.15.1	Low Risk	Licensee has not updated the manuals as necessary (specified in *Pipeline Rules* 7[1]) to ensure correct content. (*Pipeline Rules* 7[3][a])
5.1.20.1	High Risk	Licensee is not able to demonstrate that procedures in the manuals have been implemented, or it is not operating and maintaining its pipeline systems in accordance with documented procedures. (*Pipeline Rules* 7[3][b], *CSA Z662-15* [10.5.1.1(a)])
5.1.25.1	High Risk	Procedures for maintenance welding are not included in the company's operating and maintenance manuals. (*CSA Z662-15* [10.13.1.2]) *Note: Inspector must consider whether the company being assessed does any maintenance welding on its pipelines.*
5.1.30.1	High Risk	No management of change process is in place for sour service pipelines. (*CSA Z662-15* [16.8.6])

Manual #	Risk rating	Description
5.1.35.1	High Risk	Engineering assessment was not completed to address changes in service fluid composition or in operating conditions on sour service pipelines. (*CSA Z662-15* [16.8.7])

5.2 Records

Manual #	Risk rating	Description
5.2.5.1	Low Risk	Inspection and supervision records required under *Pipeline Rules*, Part 4, are not maintained for two years from the date the record is made or are not available to be submitted on request. (*Pipeline Rules*, 47) *Note: Records include records of ROW inspections, surface construction activity, water crossing inspections, etc.*
5.2.10.1	High Risk	Licensee did not submit material samples used in construction, cut-outs, or defective materials when requested by the AER. (*Pipeline Rules* 51)
5.2.15.1	High Risk	Failure to maintain all operator-recorded and SCADA system data, including field-investigated alarm actions, for 3 months from the time of the observation, or copies of records are not submitted to the AER upon request. (*Pipeline Rules*, 52[1], 52[2])
5.2.20.1	Low Risk	Failure to maintain a record of leaks, breaks, and contact damage until the pipeline is removed, or copies of records are not submitted to the AER upon request. (*Pipeline Rules*, 52[1], 52[2])
5.2.25.1	High Risk	Failure to maintain, and to provide to the AER upon request, records of inspections and evaluations required under sections 53, 54, and 55 of the *Pipeline Rules* for at least 6 years from the date of the record. (*Pipeline Rules* 56) *Note: Records includes corrosion inspections and annual evaluations.*
5.2.30.1	Low Risk	Pipeline records containing applicable information as specified under *CSA Z662-15*, clause 10.4.2, are not maintained for the life of the pipeline. (*CSA Z662-15* [10.4.2])
5.2.35.1	High Risk	For sour service pipelines, design information* (i.e., drawings, documentation, procedures) approved by the company are not kept in a design file for the life of the pipeline. (*CSA Z662-15* [16.3.1]) **As described under clause 16.3.1*
5.2.40.1	High Risk	Inspection and construction records related to the sour service design information as described in *CSA Z662-15*, clause 16.3.1, are not retained by the company for the life of the pipeline. (*CSA Z662-15* [16.5.2])
5.2.45.1	High Risk	For sour service pipelines, records related to the design, construction, modification, operations, and maintenance (in addition to records specified under clause 10.4.2) are not maintained for the life of the pipeline. (*CSA Z662-15* [16.8.2])

5.3 Design and Operating Conditions

Manual #	Risk rating	Description
5.3.5.1	High Risk	Licensee did not design, operate, and maintain its pipeline in accordance with the maximum operating pressure permitted in the licence. (*Pipeline Rules* 22[1], 23[b]) *Note: Approval to change the MOP must be obtained in accordance with* Directive 056. *(*Pipeline Rules *74;* Directive 056 *[6.9.15], [6.9.17])*
5.3.10.1	High Risk	The substance being transmitted through the pipeline is not authorized by the licence. (*Pipeline Act 17[1]*) *Note: Approval must be obtained in accordance with Directive 056 to change the substance or MOP. (Pipeline Rules 74; Directive 056 [6.9.15], [6.9.17])*
5.3.15.1	High Risk	The manufacturer's recommended MOP of HDPE was exceeded during pipeline operation or testing. (*Directive 077*, [4.3.3 – 4])
5.3.20.1	High Risk	Two independent safety systems are not installed where the inlet blended gas streams are >10 mol/kmol H_2S, or does not prevent a higher H_2S content than allowed by the licence. (*Pipeline Rules* 14[1]) *Note: Lower to higher H_2S level—a check valve at the tie-in is considered acceptable. Higher to lower H_2S level, the noted Pipeline Rules applies.*
5.3.25.1	High Risk	Safety system in blended gas streams does not have the process control to achieve the blend ratio or does not provide monitoring and automatic shutdown. (*Pipeline Rules* 14[2])
5.3.30.1	Low Risk	The class location designation was not correctly determined or upgraded, or an engineering assessment was not conducted when a class location has changed. *(CSA Z662-15* [4.3.2], [4.3.3], [4.3.4], [10.7.1])
5.3.35.1	High Risk	Pipeline was constructed under a public building, residence, office, warehouse, or factory. (*Pipeline Act* 46) *Note: Does not apply if the pipeline is delivering a substance to the building, or where the AER has approved the pipeline under certain circumstances.*
5.3.40.1	High Risk	Components are not designed to withstand operating pressures and other specified loadings. (*CSA Z662-15* [4.3.12.1])
5.3.45.1	High Risk	Suitable precautions (e.g., dampeners and braces) were not taken to minimize and control the vibration of piping during operation. (*CSA Z662-15* [4.9.2.2]) ▲
5.3.50.1	High Risk	Licensee did not consider the operating conditions or the manufacturer's published test data in the design of the reinforced composite pipeline. (*CSA Z662-15* [13.1.2.1], [13.1.2.5]) ▲ *Note: Design considerations may include effects of cyclic pressure fluctuations and other loading and dynamic effects on pipe and connections (e.g., non-metallic pipe derated for cyclic stress)*
5.3.55.1	High Risk	Maximum design temperature or the manufacturer's temperature of RCP is exceeded during operation or testing. (*CSA Z662-15* [13.1.9.2])
5.3.60.1	High Risk	Company is aware of conditions that may lead to failures and does not conduct an engineering assessment to determine suitability of continued service. (*CSA Z662-15* [10.3.2.1])

Manual #	Risk rating	Description
5.3.65.1	High Risk	Company did not conduct EA to determine suitability of continued service prior to a significant increase in the normal operating pressure. (*CSA Z662-15* [10.3.2.2]) *Note: EA is to be conducted in accordance with CSA Z662-15, clause 3.3.3.*
5.3.70.1	High Risk	No mitigation measure was taken to prevent leaks in the pipeline system as determined by an EA. (*CSA Z662-15* [10.3.2.3])
5.3.75.1	High Risk	Existing pipeline coating was not evaluated before operating the pipeline at a temperature higher than the maximum designed operating temperature. (*CSA Z662-15* [10.3.2.5]) ▲
5.3.80.1	High Risk	Stress design levels for a sour gas pipeline (>10 mol/kmol) are greater than 60% SMYS for underground piping or greater than 50% SMYS for aboveground piping. (*Pipeline Rules* 16)
5.3.85.1	High Risk	Engineering assessment for the integrity of existing pipeline systems does not include consideration of design, material, construction, operating and maintenance history, and expected operating conditions. (*CSA Z662-15* [10.1])
5.3.90.1	High Risk	Licensee did not design the reinforced composite pipeline to pressures, temperature ranges, or materials suitable for the applicable service. (*CSA Z662-15* [13.1.2.5][13.1.2.7]) *Note: This would apply to freestanding reinforced composite pipe or when reinforced composite pipe is installed in a conduit as a freestanding liner.*

5.4 Liner Operations and Maintenance

Manual #	Risk rating	Description
5.4.5.1	High Risk	Prior to thermoplastic lining of a previously in-service pipeline; the company did not repair or replace leaking areas as per clause 10.11, or evaluate imperfections as per clause 10.10, or pressure test as per clause 13.2.2.12. (*CSA Z662-15* [13.2.2.11])
5.4.10.1	Low Risk	The annulus of a thermoplastic lined pipeline was not routinely checked for pressure buildup or leakage. (*CSA Z662-15* [13.2.8.1])
5.4.15.1	Low Risk	Provisions were not made for the removal of gasses that accumulate in the line annulus. (*CSA Z662-15* [13.2.2.8])
5.4.20.1	High Risk	Changes in operating conditions or new service fluid are not compatible with the thermoplastic lined pipe. (*CSA Z662-15* [13.2.8.2])
5.4.25.1	High Risk	When a liner breach/failure has occurred, the company did not take appropriate action* to mitigate the risk of a carrier pipe failure, (*CSA Z662-15* [13.2.8.3]) **Appropriate action may include conducting an EA, shutting in of the pipeline, inspections, and other safety measures.*

5.5 Internal Corrosion Monitoring and Mitigation

Manual #	Risk rating	Description
5.5.5.1	High Risk	For operating and discontinued metallic pipelines, licensee did not conduct and document the necessity for and suitability of internal corrosion mitigation procedures annually and prior to operation of new pipeline or resumption of existing pipeline, or records are not maintained and provided to the AER on request. (*Pipeline Rules*, 54[1], 56)

Manual #	Risk rating	Description
5.5.10.1	High Risk	Internal corrosion mitigation evaluation did not include, as necessary, an evaluation of production records, operating experience, monitoring data, and inspection data. (*Pipeline Rules*, 54[2])
5.5.15.1	High Risk	Required evaluation for corrosion mitigation was not completed on a lined metallic pipeline where there was reason to believe corrosive fluids had entered the annular space. (*Pipeline Rules*, 55[2])
5.5.20.1	High Risk	Company does not institute and maintain programs to mitigate internal corrosion that was indicated by the results of testing for corrosive agents. (*CSA Z662-15* [9.10.2])
5.5.25.1	High Risk	Company does not monitor the effectiveness of its internal corrosion control programs. (*CSA Z662-15* [9.10.3.1])
5.5.30.1	High Risk	Engineering assessment was not performed on a pipeline after an extended period of nonuse and before resumption of services. (*CSA Z662-15* [10.15.2.1], [16.10.3.2]) *Note: The extended period of nonuse is dependent on the corrosivity of the system. The timeframe for the EA should have been determined in the corrosion monitoring and mitigation program. Suggested timeframe is greater than 12 months.*
5.5.35.1	High Risk	No internal/external corrosion control for steel risers and below-ground couplings/components connected to nonmetallic pipe. (*CSA Z662-15* [13.1.2.16])
5.5.40.1	High Risk	Steel risers and connections on nonmetallic pipe are not protected from internal or external corrosion, or there is no EA to support not having corrosion protection. (*CSA Z662-15* [13.1.2.16], [13.3.3.6])
5.5.45.1	High Risk	Fluids detrimental to a sour service pipeline are not separated for disposal, or no program is designed to mitigate corrosion associated with the conditions or fluids implemented in a sour service pipeline. (*CSA Z662-15* [16.7.1])
5.5.50.1	High Risk	No internal corrosion mitigation program was developed before sour fluids were admitted to the pipeline, or the effectiveness of the corrosion mitigation program was not monitored. (*CSA Z662-15* [16.7.2])
5.5.55.1	Low Risk	Pig size or design was not appropriate or was not maintained for the specified operation. (*CSA Z662-15* [16.7.3]) *Note: Applies to sour service pipelines.*
5.5.60.1	High Risk	New sour gas lines that are being activated or that are having service restored after repair were not batch treated with a corrosion inhibitor prior to operation. (*CSA Z662-15* [16.10.3.1])

5.6 External Corrosion (Cathodic Protection and Coatings)

Manual #	Risk rating	Description
5.6.5.1	High Risk	Protective coatings or corrosion-resistant alloys are not used to protect atmospherically exposed piping, or the company cannot demonstrate that anticipated corrosion is not detrimental to its serviceability. (*CSA Z662-15* [9.1.4])
5.6.10.1	Low Risk	Atmospherically exposed piping is not inspected for corrosion as specified in the company operating and maintenance manuals. (*CSA Z662-15* [9.1.5])
5.6.15.1	High Risk	No corrosion control measures are on existing bare steel pipeline, or no engineering assessment was done to determine that mitigation measures or remedial actions are not required. (*CSA-Z662* [9.1.7])

Manual #	Risk rating	Description
5.6.20.1	High Risk	Buried or submerged piping is not externally coated as required.* (*CSA Z662-15* [9.1.8]) *Note: See exceptions as allowed under CSA Z662-15 clause 9.1.3.*
5.6.25.1	High Risk	Coatings were not applied or coating defects were not repaired in accordance with *CSA Z662*. (*CSA Z662-15* [9.3.2], [9.3.6])
5.6.30.1	High Risk	Licensee does not determine areas where coating is damaged by welding operations, and does not address impacts caused by those operations. (*CSA Z662-15* [9.3.7]) *Note: Coating performance may be negatively affected by heating associated with preheat for welding, welding, and post-weld heat treatment.*
5.6.35.1	High Risk	Piping was not coated after the completion of welding operations. (*CSA Z662-15* [9.3.8])
5.6.40.1	High Risk	Licensee did not ensure that a corrosion barrier was installed on the carbon steel pipe before insulating, or it did not apply to the AER for exemption where no coating was applied. (*Directive 077* [1.2.1])
5.6.45.1	High Risk	CP was not installed on steel pipeline within 1 year of installation, or is not maintained until pipeline is abandoned. (*CSA Z662-15* [9.1.6], [9.5.1]) *Note: See exception by an EA in CSA Z662-15, clause 9.1.3.*
5.6.50.1	High Risk	The system does not provide enough current to satisfy the selected criteria for CP. (*CSA Z662-15* [9.5.2]) *Note: Criteria are given in annex B of CGA OCC-1.*
5.6.55.1	High Risk	Insulating devices are not properly installed, not properly rated, or installed in enclosed areas where no safeguards exist. (*CSA Z662-15* [9.6.1])
5.6.60.1	High Risk	Electrical contact between pipe and other structures has not been considered in the design and maintenance of the cathodic protection system. (*CSA Z662-15* [9.6.2])
5.6.65.1	High Risk	No provisions were made to prevent galvanic corrosion between dissimilar metals. (*CSA Z662-15* [9.6.3])
5.6.70.1	High Risk	Bonding conductors are not installed and maintained across separated pipeline points that are close to high-voltage DC lines. (*CSA Z662-15* [4.13.1], [4.13.2])
5.6.75.1	Low Risk	Direct-current tests are not completed, or measures were not taken to prevent detrimental effects of stray direct current. (*CSA Z662-15* [9.7.1])
5.6.80.1	Low Risk	No test stations* for electrical measurement are along the pipeline. (*CSA Z662-15* [9.8.1]) **Test stations for potential or current measurements should be provided at enough locations to ensure effective testing or monitoring of cathodic protection. Locations may include, for example, pipe casing installations, foreign metallic structure crossings and tie-ins, isolation joints, waterway crossings, bridge crossings, valve, regulating, and meter stations, galvanic anode installations, road and railroad crossings, and transitions between steel piping and nonmetallic piping, at regular intervals (such as 2 km) or as required.* *All test-station materials, connections, and locations must be suitable for the site conditions where they are installed. Piping system locations subject to induced AC voltage levels that have been identified by test results and that are defined in CSA Standard C22.3 No.6 must have test stations with dead front construction. (CGA OCC-1, 2.3.3.4.1)*

Manual #	Risk rating	Description
5.6.85.1	Low Risk	Conductor wire is not properly sized to carry current or has more than one conductor wire attached by thermal weld. The use of multi-strand conductors with strand groups larger than No. 6 AWG. (*CSA Z662-15* [9.8.8])
5.6.90.1	Low Risk	Test lead wires for CP of steel pipe are not in accordance with *CSA Z662*. (*CSA Z662-15* [9.8.2], [9.8.9])
5.6.95.1	Low Risk	Cathodic protection of steel and aluminum lines is not inspected or tested annually or before resumption of discontinued or abandoned pipelines, or records are not maintained and provided to the AER on request. (*Pipeline Rules*, 53[1], 56; *CSA Z662-15* [9.9.1], [9.9.3], [9.9.4]) *Note: Inspection and testing is to determine the effectiveness of the cathodic protection system and monitoring programs.* *An inspection or test for external corrosion mitigation is not required for a pipeline being used as a conduit for a pulled-through freestanding liner unless the outer pipeline is being used as a secondary containment vessel. (Pipeline Rules 52[2])*
5.6.100.1	High Risk	Company does not take action to correct deficiencies found in the CP survey. (*CSA Z662-15* [9.9.2]) *Note: Inspectors should compare CP survey data over the previous two years to assess whether the company has taken action to address the deficiencies.*
5.6.105.1	Low Risk	No visual inspection has been done for corrosion and the coating condition on pipe after it has been exposed. (*CSA Z662-15* [9.9.5])
5.6.110.1	High Risk	For nonmetallic pipelines, there is no corrosion barrier, or no cathodic protection has been applied to metallic risers or couplers or no EA has been conducted for the alloy materials. (*CSA Z662-15* [13.3.3.5])
5.6.115.1	High Risk	CP on steel risers for PE pipeline is not monitored. (*CSA Z662-15* [13.3.3.7])
5.6.120.1	High Risk	CP test leads attached to aluminum piping are not in accordance with *CSA Z662*. (*CSA Z662-15* [15.8.1])
5.6.125.1	High Risk	CP is not applied to aluminum piping or maintained during the operating life of the piping. (*CSA Z662-15* [15.8.2.1], [15.8.2.2], [15.8.2.3])

5.7 Emergency Valves

Manual #	Risk rating	Description
5.7.5.1	Low Risk	Valves are not at locations accessible for the purpose of isolating the pipeline for maintenance and for responding to operating emergencies (*CSA Z662-15* [4.4.1]) *Note: Valve locations should be readily accessible by authorized personnel. Valve locations should be protected from damage by people and wildlife (fenced, locked access on major installations) and have proper support to prevent differential settlement and movement of the attached piping.* (CSA Z662-15 *[4.4.2])*
5.7.10.1	High Risk	Isolating valves are not installed on lateral lines to main lines as required. (*CSA Z662-15* [4.4.3]) *Note: Applies to HVP pipelines, and does not apply to multiphase pipelines, oilfield water pipelines, and gas pipelines.*
5.7.15.1	High Risk	Valves not installed on both sides of major water crossings on HVP and LVP pipelines. (*CSA Z662-15* [4.4.9])

Manual #	Risk rating	Description
5.7.20.1	High Risk	Sectionalizing valves for HVP and CO_2 pipelines are not located outside of cities, towns, or villages at the transition from class 1 to higher locations. (*CSA Z662-15* [4.4.6])
5.7.25.1	High Risk	Sectionalizing valves on HVP and CO_2 pipelines are spaced farther than 15 km apart or are not equipped for remote operation in areas where a failure would constitute an extraordinary hazard. (*CSA Z662-15* [4.4.7])
5.7.30.1	High Risk	For HVP or CO_2 pipelines, emergency connections to facilitate depressuring/evacuating of isolated pipeline sections are not in accordance with *CSA Z662*. (*CSA Z662-15* [4.4.8])
5.7.35.1	Low Risk	Vaults housing pressure-control or -relieving devices are not regularly inspected, adequately vented, or maintained in a safe condition. (*CSA Z662-15* [10.9.7])
5.7.40.1	High Risk	Company does not have a documented operating procedure for depressurizing a component fitted with a quick-opening closure; e.g., pig sender. (*CSA Z662-15* [10.9.8])
5.7.45.1	Low Risk	Pipeline valves that can be necessary during an emergency are not inspected and partially operated at least once per calendar year. (*CSA Z662-15* [10.9.6.2]) Note: Maximum interval of 18 months between function tests (partial operation of the valve), inspections, or servicing.

5.8 Emergency Shutdowns (Gas >1% H_2S)

Manual #	Risk rating	Description
5.8.5.1	High Risk	Pipeline is not equipped with automatic emergency shutdown devices or check valves. (*Pipeline Rules* 13[1])
5.8.10.1	High Risk	An engineering assessment was not conducted to define the pipeline operating conditions and closure parameters of the emergency shutdown devices, or a record of the current assessment not maintained. (*Pipeline Rules* 13[2], [6], [7], [8])
5.8.15.1	High Risk	The automatic shutdowns or check valves do not isolate the pipeline into volume segments as specified in the licence application, or do not close as prescribed by the engineering assessment. (*Pipeline Rules* 13[3])
5.8.20.1	High Risk	Automatic shutdowns do not close and remain closed as required. (*Pipeline Rules* 13[4]) *Note: Requires on-site human intervention to reopen unless it was closed due to a planned pipeline shutdown. (Pipeline Rules 13[4][c])*
5.8.25.1	High Risk	Licensee allows pipeline or shutdown devices to operate outside of the conditions defined in the EA, or does not verify and document that conditions are as defined. (*Pipeline Rules* 13[5], 50[3])
5.8.30.1	High Risk	Emergency shutdown devices are not inspected and tested annually and serviced as required. (*Pipeline Rules* 50[1], [2], *CSA Z662-15* [10.9.6.2]) *Note: Maximum interval of 18 months between such tests, inspections, or servicing.*
5.8.35.1	Low Risk	Records of inspections, tests, and maintenance of emergency shutdown devices on sour gas pipelines (>1% H_2S) are not maintained for at least 2 years. (*Pipeline Rules* 50[4], [5])

5.9 Pressure Control (Limiting/Relieving)

Manual #	Risk rating	Description
5.9.5.1	High Risk	Pressure-control systems are not installed or properly set to prevent a pipeline from exceeding MOP. (*CSA Z662-15* [4.18.1.1], *Pipeline Rules* 22[1])
5.9.10.1	High Risk	Overpressure protection that prevents MOP from being exceeded by more than 10% or 35 kPa is not installed. (*CSA Z662-15* [4.18.1.2])
5.9.15.1	High Risk	Pressure control and overpressure protection system not designed in accordance with *CSA Z662*. (*CSA Z662-15* [4.18.2]) *Note: Reference CSA Z662 for specific design requirements.*
5.9.20.1	Low Risk	Pressure control/limiting systems (or devices) or pressure relieving systems (or devices) not inspected, assessed, tested or replaced as required. (*CSA Z662-15* [10.9.5.2], [10.9.5.3], [10.9.5.4]) *Note: This noncompliance statement is for **other than** artificial lift systems, which are addressed under Directive 077.*
5.9.25.1	Low Risk	Records of pressure control and pressure relieving system tests and inspections and of any corrective action taken have not been kept. (*CSA Z662-15* [10.9.5.6]) *Note: This noncompliance statement is for **other than** artificial lift systems, which are addressed under Directive 077.*
5.9.30.1	High Risk	Discharge stacks at pressure-relieving installations are not protected by rain caps to prevent the entry of water, where applicable, or are not located where fluid could be safely discharged and dispersed into the atmosphere or containment. (*CSA Z662-15* [4.18.3.1])
5.9.35.1	High Risk	Pressure-relieving devices and components, including vent lines, pipe, and openings, are not adequately sized to prevent hammering of the valves and impairment of relief capacity. (*CSA Z662-15* [4.18.3.2]) ▲
5.9.40.1	Low Risk	A pressure control system and overpressure protection are not installed where two or more pipelines are connected and where their licensed MOPs differ by more than 5% of the lowest MOP. (*Pipeline Rules* 22[2]) *Note: If the actual operating pressure of the connected pipelines exceeds the lower MOP, refer to 5.3.5.1 in this manual.*

5.10 Pressure Control for Artificial Lift Systems

Manual #	Risk rating	Description
5.10.5.1	High Risk	Failure by the licensee to meet any of the overpressure protection requirements* for artificial lift equipment in section 3.2 (1) of *Directive 077*. (*Directive 077* [3.2(1)]) **When artificial lift equipment is capable of supplying pressure in excess of the pipeline MOP.*
5.10.10.1	High Risk	Failure to repair or replace overpressure protection devices that are defective or nonfunctioning before resuming pipeline operation. (*Directive 077* [3.2(2)])
5.10.15.1	Low Risk	Failure to maintain adequate records related to the inspection, assessment, and testing of overpressure protection devices, or submit this information to the AER upon request. (*Directive 077* [3.2(3)])

Manual #	Risk rating	Description
5.10.20.1	Low Risk	Failure, before resuming pipeline operation, to ensure that the records of inspection, assessment, and testing of the overpressure protection devices include effective evaluations and the resolution of issues related to defective or nonfunctioning devices. (*Directive 077* [3.2(4)])

5.11 Leak Detection

Manual #	Risk rating	Description
5.11.5.1	High Risk	Company's leak detection program for liquid hydrocarbon pipelines* does not meet the requirements of annex E of *CSA Z662*. (*Pipeline Rules* 9[4], [48], *CSA Z662-15* Annex E) **Annex E applies to liquid hydrocarbon pipelines with the exception of multiphase pipelines and pipelines from oil wells to production facilities.*
5.11.10.1	High Risk	Company does not interpret material balance records in accordance with annex E of *CSA Z662*, or sound engineering practices are not used to derive measurement uncertainties and alarm tolerances. (*Pipeline Rules* 48, 49) *Note: This does not apply to multiphase pipelines.*
5.11.15.1	High Risk	Company does not have an acceptable leak detection program for all liquid hydrocarbon pipelines. (*CSA Z662-15* [10.3.3.2], [10.3.3.3], [10.3.3.4]) *Note: This applies to ALL liquid hydrocarbon (HVP, LVP) pipeline systems, not including multiphase pipelines.*
5.11.20.1	High Risk	For gas and carbon dioxide pipeline systems, the company does not have a leak detection program that includes regular surveys. (*CSA Z662-15* [10.3.4.1], [10.3.4.3]) *Note: Such leak detection surveys or analysis may consist of gas-detector surveys, aerial surveys, vegetation surveys, gas-volume monitoring analysis, bar-hole surveys, surface detection surveys, mathematical modelling analysis, etc.*
5.11.25.1	High Risk	For oilfield water pipelines or multiphase pipelines, the company does not have a leak detection program that includes regular surveys and a system for early detection of leaks where the environment may be impaired. (*CSA Z662-15* [10.3.5.1], [10.3.5.3], [4.20.2]) *Note: Such leak detection surveys or analysis may consist of ROW surveys, aerial surveys, vegetation surveys, volume-monitoring analysis, bar-hole surveys, surface detection surveys, pressure tests, mathematical modeling analysis, etc.*
5.11.30.1	High Risk	Evidence of leaks from hydrocarbon, gas, oilfield water, or multiphase pipelines was not immediately investigated. (*CSA Z662-15* [10.3.3.5], [10.3.4.2], [10.3.5.2])

5.12 Signage

Manual #	Risk rating	Description
5.12.5.1	Low Risk	Pipeline warning signs are not installed as required by the *Pipeline Rules*. (*Pipeline Rules* 68[1], 68[2])
5.12.10.1	Low Risk	Pipeline warning/identification signs are not installed in strategic areas as specified in *CSA Z662-15*, clauses 10.5.3.1 and 10.5.3.2. (*Pipeline Rules* 68[1]) *Note: Strategic areas may include utility corridors, construction activity, drainage systems, and other anticipated third-party activity.*
5.12.15.1	Low Risk	Pipeline warning signs are not maintained or replaced when defaced, worn, or illegible, or are missing or destroyed. (*Pipeline Rules* 68[4])
5.12.20.1	High Risk	Pipeline warning signs do not have a valid telephone number for immediate emergency response as required by schedule 1. (*Pipeline Rules* 68[5])
5.12.25.1	Low Risk	A change in pipeline warning sign information as required by schedule 1, other than the telephone number, is not updated within 180 days. (*Pipeline Rules* 68[5])
5.12.30.1	Low Risk	Existing pipeline warning signs indicate an abandoned pipeline. (*Pipeline Rules* 68[8])
5.12.35.1	Low Risk	HVP pipeline warning sign does not clearly indicate the name of the highest vapour pressure HVP product that may be conveyed. (*Pipeline Rules* 69)
5.12.40.1	Low Risk	Group pipeline warning signs are not installed in accordance with section 70 of the *Pipeline Rules*. (*Pipeline Rules* 70[1], 70[2])
5.12.45.1	High Risk	A large facility identification sign is not installed at the entrance to any gas compressor station or oil pumping station in accordance with schedule 2, or the sign does not contain appropriate warning symbols. (*Pipeline Rules* 71[2])

5.13 Pipeline Installations (Compressors, Pumps)

Manual #	Risk rating	Description
5.13.5.1	High Risk	Shutdown devices and systems are not inspected and tested periodically to ensure proper functionality. (*CSA Z662-15* [10.9.1.2])
5.13.10.1	High Risk	Company has not developed procedures for commissioning compressors over 750 KW and pump stations over 375 KW, or procedures do not include checking the satisfactory operation of the protective devices. (*CSA Z662-15* [4.14.1.6])
5.13.15.1	High Risk	Adequate procedures for inspection, repair, and replacement are not in place to ensure piping/equipment integrity for stations with corrosive conditions. (*CSA Z662-15* [10.9.1.3])
5.13.20.1	High Risk	Procedures for inspection, testing, and maintenance of pipe-type or bottle-type gas holders or pipe-type storage vessels do not conform to requirements (related to corrosion detection, sampling/testing of gas, inspection safety controls, and record keeping). (*CSA Z662-15* [10.9.4])
5.13.25.1	High Risk	Piping is not made of steel (exception: instrument, control, and sampling piping) for compressor stations over 750 KW and for pump stations over 375 KW. (*CSA Z662-15* [4.14.2.11])
5.13.30.1	High Risk	Flare and drain systems of pump stations over 375 KW are not in accordance with *CSA Z662*. (*CSA Z662-15* [4.14.3.2])

5.14 Right-of-Way Surveillance

Manual #	Risk rating	Description
5.14.5.1	High Risk	ROW inspections are not conducted in accordance with the *Pipeline Rules* at least annually for a pipeline that crosses water or unstable ground. (*Pipeline Rules* 43[1], *CSA Z662-15* [10.6.1])
5.14.10.1	High Risk	Underwater crossings are not inspected periodically to ensure safety or integrity of the crossing. (*CSA Z662-15* [10.6.4.2]) *Note: Underwater crossings shall be inspected for adequacy of cover, accumulation of debris, and other conditions that can affect the safety or integrity of the crossing.*
5.14.15.1	High Risk	ROW is not inspected annually or in accordance with the inspection interval stated in the integrity management plan. (*Pipeline Rules* 43[2], *CSA Z662-15* [10.6.1])
5.14.20.1	High Risk	ROW inspections are not conducted at the appropriate time of year or to minimize property disturbance or damage. (*Pipeline Rules* 43[3])
5.14.25.1	High Risk	Licensee does not carry out additional ROW inspections for LVP,* HVP, and sour gas pipelines as determined by class location and as required by the *Pipeline Rules*. (*Pipeline Rules* 44[1], 44[2]) **LVP does not include multiphase fluids or oilfield water. (Pipeline Rules 44[2])*
5.14.30.1	High Risk	Licensee is aware of surface construction activity within 30 m of a LVP, HVP, or sour gas (>10 mol/kmol) pipeline, and does not take required action to ensure the safety of the pipeline. (*Pipeline Rules* 45) *Note: Licensee must meet with the parties either before or immediately after the construction activity has commenced to determine what safety measures are necessary to ensure the safety of the pipeline; it must confirm the depth of the pipeline (if uncertain) prior to any further construction activity, and it must supervise the construction (at least once per day) during the construction activity to ensure that safety measures are implemented. (Pipeline Rules 45[a], [b], [c])*
5.14.35.1	High Risk	Licensee charges an inspection fee to the party carrying out a surface activity within 30 m of a LVP, HVP, or sour gas pipeline >10 mol/kmol. (*Pipeline Rules* 46)
5.14.40.1	High Risk	Vegetation on pipeline ROW is not controlled (where the terms of the easement permit) to maintain clear visibility from the air or to provide ready access for maintenance crews. (*CSA Z662-15* [10.6.2])
5.14.45.1	High Risk	Company did not maintain access or prevent unauthorized operation of valves or other exposed facilities. (*CSA Z662-15* [10.6.3])

6 Repairs and Integrity

6.1 Pipe Repair

Manual #	Risk rating	Description
6.1.5.1	High Risk	Pipe manufacturing defects found during installation are not repaired following manufacturer specifications, or are not cut out as a cylinder. (*CSA Z662-15* [6.3.1])
6.1.10.1	High Risk	Gouges, grooves, or dents found during installation are not repaired using an appropriate repair method. (*CSA Z662-15* [6.3.2], [6.3.3.2], [6.3.3.3], [6.3.3.4])

Manual #	Risk rating	Description
6.1.15.1	High Risk	Dents in aluminum pipe that are considered defects as per *CSA Z662-15* clause 15.9.1.1 are not removed by cutting out as a cylinder or repaired as specified. (*CSA Z662-15* [15.9.1.1], [15.5.6.2], [15.5.6.3])
6.1.20.1	High Risk	Gouges, grooves, or arc burns found on operating steel pipe are not repaired using acceptable repair methods. (*CSA Z662-15* [10.10.3], table 10.1)
6.1.25.1	High Risk	Dents or pipe body surface cracks that are considered defects as per *CSA Z662-15* were not repaired using an acceptable method. (*CSA Z662-15* [10.10.4.2], [10.10.5])
6.1.30.1	High Risk	Pipe found to contain leaks was not repaired using an acceptable repair method. (*CSA Z662-15* [10.11.1.4])
6.1.35.1	High Risk	Grinding repairs are not in accordance with *CSA Z662-15* [10.11.2.2], [10.11.2.3].
6.1.40.1	High Risk	Where a repair was made by pipe replacement, the minimum replacement length requirements were not met. (*CSA Z662* [10.11.3(b)])
6.1.45.1	Low Risk	The pretested pipe used for a repair replacement was not properly stored, or the pretesting documentation was not retained. (*CSA Z662-15* [10.11.3(c)])
6.1.50.1	High Risk	A defect removed by hot tapping was not done in accordance with clause 10.11.5 or performed as specified in clause 10.14. (*CSA Z662-15* [10.11.5]
6.1.55.1	High Risk	Permanent repairs to polyethylene pipelines with defects were not made by cutting out the defective portions as cylinders and replacing them using heat fusion joining. (*CSA Z662-15* [13.3.9.2])
6.1.60.1	High Risk	On sour service pipelines, internal corrosion defects were not repaired by pipe replacement, or repair methods are not done in accordance with *CSA Z662-15*, 16.4 and 16.6. (*CSA Z662-15* [16.8.3], [16.9.4]) *Note: In accordance with clause 16.9.4, table 10.1 is not to be used for internal corrosion features in sour service.*
6.1.65.1	High Risk	External coating was not applied following cleaning, evaluation, or repair of the pipe. (*CSA Z662-15* [10.11.1.3])
6.1.70.1	High Risk	Composite reinforced pipeline was not repaired in accordance with manufacturer's recommendations. (*CSA Z662-15*, [13.1.10.1])

6.2 Sleeves and Temporary Repairs

Manual #	Risk rating	Description
6.2.5.1	High Risk	Permanent repair sleeves do not extend at least 50 mm beyond the ends of the defects, or a reinforcement sleeve has been used for permanent repair without internal corrosion being arrested. (*CSA Z662-15* [10.11.4.1]) *Note: Sleeves on aluminum pipelines cannot be welded to the pipe.*

Manual #	Risk rating	Description
6.2.10.1	High Risk	Permanent repair sleeves on steel pipe were not installed in accordance with *CSA Z662*. (*CSA Z662-15* [10.11.4.2], [10.11.4.3], [10.11.4.4]) *Includes* *- steel reinforcement and pressure containment repair sleeves (CSA Z662-15, clause 10.11.4.2);* *- composite reinforcement repair sleeves (CSA Z662-15, clause 10.11.4.3); and* *- steel compression reinforcement repair sleeves (CSA Z662-15 10.11.4.4).*
6.2.15.1	High Risk	Full-encirclement clamps used for temporary repairs on PE pipelines are not approved by the pipe manufacturer or were not permanently repaired within 1 year. (*CSA Z662-15* [13.3.9.3])
6.2.20.1	High Risk	Repair sleeves on aluminum pipelines are not in accordance with *CSA Z662*. (*CSA Z662-15* [10.11.4.1], [15.9.1.3]) *Note: Sleeves on aluminum pipelines cannot be welded to the pipe.*
6.2.25.1	High Risk	Temporary repair method is not based on an EA. (*CSA Z662-15* [3.3], [10.12.1.1])
6.2.30.1	High Risk	Temporary repair was not replaced with a permanent repair within one year, or was not monitored as specified by an EA. (*CSA Z662-15* [10.12.1.2])

6.3 Integrity and Safety

Manual #	Risk rating	Description
6.3.5.1	High Risk	Imperfections are found in steel piping, and evaluations are not made in accordance with *CSA Z662-15* clause 10.10.1 to determine suitability of or restrictions to continued service. (*CSA Z662-15* [10.10.1.1], [10.10.1.2], [10.10.1.4], [10.10.1.5])
6.3.10.1	High Risk	Piping suspected of containing defects has not been depressurized as necessary for safe excavation and repair. (*CSA Z662-15* [10.10.1.3], [10.10.1.4], [10.10.1.5])
6.3.15.1	High Risk	Corrosion imperfections in steel pipe were not properly assessed or were not repaired using an acceptable repair method when required. (*CSA Z662-15* [10.10.2.1], [10.10.2.6], [10.10.2.7]).
6.3.20.1	Low Risk	Dents in pipe were not appropriately inspected. (*CSA Z662-15* [10.10.4.1])
6.3.25.1	High Risk	Cuts to pipeline containing flammable mixtures were not made with mechanical cutters. (*CSA Z662-15* [10.11.1.1]) *Exception: Pipelines containing 100% natural gas may be hot-cut using appropriate procedures that include the provisions of CSA Z662-15, clause 10.5.7.*
6.3.30.1	High Risk	Proper bonding and grounding procedures were not used to eliminate sources of ignition caused by impressed currents from cathodic protection when pipe sections were removed. (*CSA Z662-15* [10.11.1.2])
6.3.35.1	Low Risk	After a composite reinforced pipeline was repaired, the pipe was not left exposed in order to conduct the minimum of 4 hours visual service test at the highest available operating pressure. (*CSA Z662-15* [13.1.8.2])
6.3.40.1	High Risk	Repairs on PE gas lines were not pretested or leak tested, or flame ionization or a proven equivalent was not conducted 48 hrs and 1 month after the pipeline was returned to service. (*CSA Z662-15* [13.3.9.4])

7 Surface Pipelines

7.1 General

Manual #	Risk rating	Description
7.1.5.1	High Risk	Licensee did not obtain AER approval for a temporary surface pipeline prior to construction. (*Pipeline Rules* 21[1], *Directive 077*, [7.2][1]) *For surface pipelines associated with testing a well for less than 21 days, see Directive 077 for approval process. For all others, a Directive 56 application is required.*
7.1.10.1	High Risk	Licensee did not complete consultation and notification requirements. (*Directive 077* [7.2.2(a)], [7.2.5]). *Note: This statement applies to surface pipelines associated with well testing less than 21 days. Consultation and notification requirements are to be done in accordance with Directive 056, section 2.*
7.1.15.1	High Risk	A surface pipeline for testing a well for no more than 21 days does not meet technical requirements. (*Directive 077* [7.2(2)(b), (c)])
7.1.20.1	High Risk	Licensee did not remove a pipeline used for testing a well for no more than 21 days and reclaim the ROW within the specified time periods. (*Directive 077* [7.2.4])
7.1.25.1	Low Risk	Licensee did not install a pressure relieving device where a pressure increase to above MOP is possible due to a rise in temperature. (*Pipeline Rules* 21[2][a])
7.1.30.1	Low Risk	Licensee did not install appropriate safely and operational systems that take into account expansion/contraction, pipe material temperature limitations, and lateral or vertical movement. (*Pipeline Rules* 21[2], [b], [c], [d], [e])
7.1.35.1	High Risk	A surface pipeline is not buried at a road or trail crossing, or pipeline warning signs are not installed as required. (*Pipeline Rules* 21[3])
7.1.40.1	High Risk	Additional precautions (extra signs, other warnings) were not taken to address conditions that may obscure or endanger the surface pipeline, such as equipment working nearby, or off-road vehicular traffic. (*Pipeline Rules* 21[4])

8 Discontinuation, Abandonment, Removal, and Resumption

8.1 General

Manual #	Risk rating	Description
8.1.5.1	High Risk	Pipeline is not discontinued or abandoned when directed by the AER. (*Pipeline Act* 23[1])
8.1.10.1	High Risk	Pipeline is not discontinued, abandoned, or returned to service after 12 months of no active flowing service. (*Pipeline Rules* 82[1]) *Note: This refers to the physical state of the pipeline, not simply a licence amendment.*
8.1.11.1	High Risk	Licensee resumes operation of a pipeline that was discontinued, abandoned or not in active flowing service in the past 12 months without obtaining approval from the AER, or having been otherwise authorized by the AER. (*Pipeline Rules* 85[1]) *Note: "Otherwise authorized" by the AER may be given by the field centre.*

Manual #	Risk rating	Description
8.1.15.1	Low Risk	Pipeline is not abandoned or discontinued in accordance with the requirements of *Directive 056*. (*Pipeline Rules* 82[2]) *Note: This refers to a licence amendment, but it is included in the manual because inspectors would identify this during inspections.*
8.1.20.1	High Risk	Discontinued or abandoned* pipeline is not physically isolated or discontinued from any operating facility or other pipeline. (*Pipeline Rules* 82[3][a]) **The authority for the abandoned pipeline requirements is firstly found under Pipeline Rules 82(5), which references subsection (3).*
8.1.25.1	High Risk	Discontinued pipeline is not cleaned when necessary or purged with fresh water, air, or inert gas. (*Pipeline Rules* 82[3][b], [c])
8.1.30.1	High Risk	Discontinued pipeline is not protected by suitable corrosion control measures. (*Pipeline Rules* 82[3][d])
8.1.35.1	High Risk	Dead legs or fluid traps that remain after pipeline is discontinued from an operating pipeline are not monitored or inspected for corrosion. (*Pipeline Rules* 82[3][e])
8.1.40.1	High Risk	Discontinued or abandoned* pipeline is not left in a safe condition. (*Pipeline Rules* 82[3][f]) **The authority for ensuring an abandoned pipeline is left in a safe condition is firstly found under Pipeline Rules 82(5), which references subsection (3).* *Note: Unsafe condition may include loss of cover, ROW sloughing, exposure, surface equipment, interference with development, or explosive mixtures left in the pipeline.*
8.1.45.1	High Risk	Pipeline is not physically isolated from the operating system (dead leg or stagnant fluid traps) and is not maintained as an operating pipeline. (*Pipeline Rules* 82[4])
8.1.50.1	High Risk	Surface equipment is not removed from abandoned pipeline where required. (*Pipeline Rules* 82[5][a])
8.1.55.1	High Risk	Abandoned pipeline is not cut off at the pipeline level where required. (*Pipeline Rules* 82[5][b]) *Note: It does not have to be cut off at pipe level (bottom of the ditch) if it is within the boundaries of a facility that will continue to operate.*
8.1.60.1	High Risk	Abandoned pipeline is not purged with uninhibited fresh water, air, or inert gas. (*Pipeline Rules* 82[5][c])
8.1.65.1	Low Risk	Open ends of abandoned pipeline are not plugged or capped and tagged as required. (*Pipeline Rules* 82[5][e], [f])
8.1.70.1		Removed. Was a duplicate of 8.1.80.1.
8.1.75.1	Low Risk	A polymeric pipeline or liner to be discontinued or abandoned is not monitored for hazardous gas constituents for a sufficient time period. (*Pipeline Rules* 82[7])

Manual #	Risk rating	Description
8.1.80.1	High Risk	A licensee who exposes stagnant fluid traps or dead legs on operating pipelines did not meet the requirements of the *Pipeline Rules*. (*Pipeline Rules* 82[6], [8]) *Note:* *Dead legs and fluid traps resulting from previously discontinued or abandoned pipelines shall be addressed by* *(a) removing and replacing the affected parts of the pipeline,* *(b) establishing permanent access to the affected parts of the pipeline and subjecting them to a scheduled inspection program,* *(c) confirming and documenting that the contained fluids are noncorrosive, or* *(d) some other method acceptable to the AER.*
8.1.85.1	High Risk	A pipeline is not abandoned as required by section 82(9) of the *Pipeline Rules*. (*Pipeline Rules* 82[9])

9 Pipeline Incidents

9.1 Reporting

Manual #	Risk rating	Description
9.1.5.1	High Risk	Licensee does not immediately notify the AER of a pipeline leak, a break, a test failure, or contact damage by telephoning the appropriate AER field centre. (*Pipeline Act* 35[1], *Pipeline Rules* 2[2])
9.1.10.1	Low Risk	The licensee does not inform the AER of the correct location of a pipeline leak or break. (*Pipeline Act* 35[1])
9.1.15.1	High Risk	The licensee does not immediately notify the AER of pipeline contact damage.* (*Pipeline Act* 35[2][b], *Pipeline Rules* 2[2]) ** See definition for contact damage. (Pipeline Act 1[1][e])*
9.1.20.1	High Risk	The licensee does not immediately report a leak or break that occurs in a pipeline during pressure testing. (*Pipeline Rules* 27)
9.1.25.1	High Risk	The licensee does not submit a written report of a leak, a break, or contact damage to the AER as requested. (*Pipeline Rules* 76)
9.1.30.1	Low Risk	The licensee does not submit to the AER accurate information about the spill quantity, containment, and recovery. (*Pipeline Rules* 76[b], [f])

9.2 Response

Manual #	Risk rating	Description
9.2.5.1	High Risk	Ground disturbance activity that caused contact with a pipeline was not immediately stopped. (*Pipeline Act* 35[2][a])
9.2.10.1	High Risk	The person involved in a ground disturbance activity that caused contact with a pipeline did not immediately notify the pipeline licensee of the contact location or of the damage caused by the contact.* (*Pipeline Act* 35[2][a]) **Contact damage means damage to a pipeline that occurs during a ground disturbance and that results in a puncture or crack in the pipeline, a scratch, gouge, flattening, or dent on the pipeline surface, or damage to the pipeline's protective coating that compromises the functionality of the coating with the exception of minor damage that may occur during final hand excavation and external cleaning. (Pipeline Act 1[1][e]*

Manual #	Risk rating	Description
9.2.15.1	High Risk	A ground disturbance activity stopped due to pipeline contact was restarted without approval from the licensee or the AER. (*Pipeline Act* 35[3])
9.2.20.1	High Risk	A licensee who caused damage to a structure, another pipeline, or a private or public utility did not immediately repair the damage or make other arrangements with the owner of the structure, pipeline, or utility. (*Pipeline Act* 45)
9.2.25.1	High Risk	Licensee does not take immediate steps to stop a liquid release at its source. (*Pipeline Rules* 77)
9.2.30.1	High Risk	Licensee does not take immediate steps to contain a spill. (*Pipeline Rules* 77)
9.2.35.1	High Risk	Licensee did not take immediate steps to clean up* a spill. (*Pipeline Rules* 77) **Clean up refers to all free fluids being removed.*
9.2.40.1	High Risk	A leak or rupture that occurs during pressure testing is not investigated. (*CSA Z662-15* [8.9.3])
9.2.45.1	High Risk	Following a failed pressure test, the pipeline is not repaired and retested as required. (*CSA Z662-15* [8.9.1], [8.9.2])

10 Other Requirements

10.1 Related to *Directive 038: Noise Control*

Note: *Directive 038* provides noise control requirements that apply to all operations and facilities under the jurisdiction of the AER, provides background information, and describes approaches for dealing with noise problems.

Manual #	Risk rating	Description
99.1.5.1	High Risk	A licensee is not operating a pipeline facility or did not conduct pipeline construction and operations within the maximum noise level limitations specified in *Directive 038*. (*Pipeline Rules* 17) *Note: All pipeline installations under the AER's jurisdiction must meet the requirements of Directive 038. (Directive 056, s.6.9.26.4)* *An NIA must be completed before submitting a pipeline installation application for any new permanent pipeline installation or for modifications to existing permanent pipeline installations if there is a reasonable expectation of a continuous or intermittent noise source. (Directive 056, s.6.9.26.4 [72])* *For the purpose of an NIA, a permanent pipeline installation is a pipeline installation in operation for more than 2 months. (Directive 056, s.6.9.26.4[72(a)])*
99.1.10.1	High Risk	The venting or flaring of a gaseous pressure test medium is not in accordance with *Directive 038* and *Directive 060*. (*Pipeline Rules* 38)

10.2 Related to *Directive 055: Storage Requirements for the Upstream Petroleum Industry*

Note: *Directive 055* (*D055*) identifies the requirements for the storage of materials produced, generated (including wastes), or used by the upstream petroleum industry. For the purposes of *D055*, the upstream petroleum industry is limited to facilities, well sites, and pipelines licensed or approved by the AER for the exploration, production, recovery, handling, processing, treatment, disposal, or transmission of hydrocarbon-based resources or any associated substances or wastes.

Manual #	Risk rating	Description
99.2.5.1	High Risk	Contaminated materials or materials possessing the potential to leach stored directly on the ground. (*OGCR* 8.030[1]; *Directive 055* [3.5])
99.2.10.1	Low Risk	Aboveground storage tank(s) not constructed or operated appropriately. (*OGCR* 8.030[1]; *Directive 055* [5.1], [5.3])
99.2.15.1	High Risk	No secondary containment as required. (*OGCR* 8.030[2]; *Directive 055* [5.1], [5.3.2], [6.1], [8.2], Appendix 2[1], [2.2.1])
99.2.20.1	Low Risk	No secondary containment (containers and indoor tanks). (*OGCR* 8.030[2]; *Directive 055* [5.3.2.3], [7])
99.2.25.1	Low Risk	No system to monitor the interstitial space. (*OGCR* 8.030[2]; *Directive 055* [5.3.3], [6.2], Appendix 2)
99.2.30.1	Low Risk	Required measures not incorporated to prevent overfilling of tanks. (*OGCR* 8.030[1]; *Directive 055* [5.3.1], [5.3.3], [6.1])
99.2.35.1	Low Risk	Spill control device(s) not used around hose connections at fluid transfer points. (*OGCR* 8.030[1]; *Directive 055* [5.3.1], [5.3.3], [6.1])
99.2.40.1	High Risk	No leak detection and secondary containment where required (single-walled underground storage tank retrofitted between January 1, 1996, and January 1, 2002). (*OGCR* 8.030[2]; *Directive 055* Appendix 2[2.2.1])
99.2.45.1	Low Risk	Secondary containment not designed, constructed, sized, and maintained as required. (*OGCR* 8.030[2]; *Directive 055* [5.3], [5.3.2.1], [5.3.2.1(a)], [5.3.2.1(b)], [5.3.3], [6.1], [7], Appendix 2[1], [2.2.1])
99.2.50.1	High Risk	Temporary single-walled aboveground tank not diked where required. [*OGCR* 8.030[1]; Directive 055 [3.5])
99.2.55.1	Low Risk	Aboveground or underground tank(s) out of service does not meet the requirements. (*OGCR* 8.030[2]; *Directive 055* [12])
99.2.60.1	High Risk	Single-walled underground storage tank not tested within past three years (tank installed prior to January 1, 1996). (*OGCR* 8.030[2]; *Directive 055*, Appendix 2 [2.2.2])
99.2.65.1	Low Risk	Aboveground storage tank not tested within past five years (pre-1996 site where current secondary containment requirements are not met). (*OGCR* 8.030[2]; *Directive 055*, Appendix 2[2], [2.1.2])

10.3 Related to *Directive 058: Oilfield Waste Management Requirements for the Upstream Petroleum Industry*

Note: *Directive 058* outlines comprehensive regulatory requirements for the handling, treatment, and disposal of upstream oilfield waste. It provides a comprehensive overview of oilfield waste characterization and classification, waste manifesting and tracking, oilfield waste management facilities, application requirements for oilfield waste management facilities, waste management, and disposal options.

Manual #	Risk rating	Description
99.3.5.1	High Risk	Waste sent to facility not authorized to accept it. (*Directive 058* [2.1(1)])
99.3.10.1	High Risk	Oilfield wastes are mixed/diluted to avoid regulatory requirements. (*Directive 058* [5.5]; *Interim Directive [ID] 99-04* [2])
99.3.15.1	High Risk	Conditions not met for on-site land treatment. (*Directive 058* [16.2(1) – (3)]; *Informational Letter [IL] 98-02* [4.2])
99.3.20.1	High Risk	Oilfield waste was not treated according to one-time, on-site biopile/biocell treatment requirements. (*Directive 058* [16.3(1), (4)(c)])
99.3.25.1	High Risk	One-time, on-site biopile or biocell containment device or leachate collection system is not appropriately designed or operated. (*Directive 055* [8.1]; *Directive 058* [11.6], [16.3])
99.3.30.1	High Risk	Small batch feed incinerator or mobile thermal treatment facility not operating according to requirements. (*Directive 058* [11.6], [17.4], [17.5]; *Interim Directive [ID] 2000-03* [3.1(a), (b)])
99.3.35.1	Low Risk	Small batch feed incinerator or mobile thermal treatment facility does not notify AER as required. (*Directive 058* [17.4], [17.5(3)])
99.3.40.1	High Risk	Conditions not met for spreading of oily by-products to roads. (*Directive 058* [29.3], [29.8]; *Informational Letter [IL] 99-02*)
99.3.45.1	High Risk	Banned oilfield wastes injected into pipeline system. (*Directive 058* [6], [6.1])
99.3.50.1	High Risk	Oilfield waste generator not tracking oilfield waste from cradle to grave. (*Directive 058* [7.1], [9.1], [9.2])
99.3.55.1	Low Risk	Waste tracking system data or manifest copies and supporting documentation not retained for two years. (*Directive 058* [8.9], [9.2])
99.3.60.1	Low Risk	AER manifests not completed or completed improperly for DOWs transported on public roads. (*Directive 058* [7.1], [8]; *Interim Directive [ID] 2000-03* [3.4])
99.3.65.1	Low Risk	Discrepancy on the waste manifest is not reconciled. (*Directive 058* [8.8])
99.3.70.1	Low Risk	Biopile or biocell records not kept for two years. (*Directive 058* [16.3(5)], [11.8])

10.4 Related to *Directive 060: Upstream Petroleum Industry Flaring, Incinerating, and Venting*

Note: *Directive 060* contains the requirements for flaring, incinerating, and venting activities conducted in Alberta at all upstream petroleum industry wells and facilities, including pipeline installations that convey gas (e.g., compressor stations, line-heaters, etc.) and that are licensed by the AER in accordance with the *Pipeline Act*.

Manual #	Risk rating	Description
99.4.5.1	High Risk	No flare or incinerator stacks where one is required. (*Pipeline Rules* 1.2[2], 79; *Directive 060* [6.2(2)], [8.1(5)(b)])
99.4.10.1	Low Risk	Stack height or design does not meet requirements. (*Pipeline Rules* 1.2[2], 79; *Directive 060* [6.2(2)], [7.4])
99.4.15.1	High Risk	Pilot/ignition device(s) not available/operable where required. (*Pipeline Rules* 1.2[2], 79; *Directive 060* [7.3], [7.3.1](1), Appendix 13)
99.4.20.1	High Risk	No flame arrester, equivalent safety device, or appropriate engineering and operating practices to prevent back flash where required. (*Pipeline Rules* 1.2[2], 79; *Directive 060* [6.1(3)], [7.7(1) – (3)], [8.1(9)])
99.4.25.1	High Risk	No knockout drum or flare separator where required. (*Pipeline Rules* 1.2[2], 79; *Directive 060* [7.6(2)], [7.6.1], [8.1(5)(b)])
99.4.30.1	High Risk	Knockout drum or flare separator controls, equipment or design does not meet requirements. (*Pipeline Rules* 1.2[2], 79; *Directive 060* [6.1(3)], [7.6])
99.4.35.1	High Risk	Exposed flame from an incinerator. (*Pipeline Rules* 1.2[2], 79; *Directive 060* [6.1(3)], [7.1.2 (1)(a)])
99.4.40.1	High Risk	Nondistribution specification gas is intentionally released from a pipeline, and not burned, where it could support stable combustion, or did not meet criteria for allowable venting. (*Pipeline Rules* 1.2[2], 79; *Directive 060* [6.2(2)(b)], [8.1(2), (5)])
99.4.45.1	High Risk	Venting practices not conducted in accordance with the requirements. (*Pipeline Rules* 1.2[2], 79[3][4]; *Directive 060* [8.1(4) – (7)])
99.4.50.1	High Risk	Failure to conduct dispersion modelling for flaring or incinerating gas with greater than 10 mol/kmol H2S or 1 tonne per day of sulphur. (*Pipeline Rules* 1.2[2], *Directive 060* [3.6(1), (2)], [7.12(1), (2)])
99.4.55.1	High Risk	Decision tree not used to evaluate pipeline flares, incinerators, and vents, or evaluations not updated prior to a planned event. (*Pipeline Rules* 1.2[2], *Directive 060* [6.1, Figure 7], [7.11(4)], [8.1(1)], [9.1])
99.4.60.1	Low Risk	Failure to keep flaring, incinerating, and venting logs as required. (*Pipeline Rules* 1.2[2], *Directive 060* [10.4(1)(b) – (e), (2)])
99.4.65.1	High Risk	Flaring or incinerating sour gas containing more than 50 mol/kmol H_2S without a permit where required. (*Pipeline Rules* 1.2[2], *Directive 060* [3.3.1(1)], [3.3.2(2) – (4)], [6.2(3)])
99.4.70.1	High Risk	Failure to comply with any condition of flaring permit or approval (temporary permits, volume allowance threshold exceedance permits, and blanket permits). (*Pipeline Rules* 1.2[2], *Directive 060* [3.3(1)])
99.4.75.1	High Risk	Failure to comply with conditions for flaring or incinerating small volumes of sour gas containing more than 50 mol/kmol H_2S when a permit is not required. (*Pipeline Rules* 1.2[2], *Directive 060* [3.3.2(2) – (4)])

Manual #	Risk rating	Description
99.4.80.1	Low Risk	Failure to notify the appropriate AER field centre of flaring, incinerating, or venting events as required. (*Pipeline Rules* 1.2[2], *Directive 060* [2.9(6)], [2.11.1(3)], [3.9], [4.2], [5.4], [6.4(1) – (3)], table 1, table 2)
99.4.85.1	High Risk	No resident notification and/or consultation. (*Pipeline Rules* 1.2[2], *Directive 060* [2.5(1)(c)(i), (6)(c), (6)(d)], [2.9(3), (5), (6)], [2.11.1(3)], [3.9(1), (4) – (7)], [4.2(1)], [5.4(1)], [6.4(1)], table 1, table 2)
99.4.90.1	Low Risk	Public information packages or resident notification information do not meet the requirements. (*Pipeline Rules* 1.2[2], *Directive 060* [2.9.1], [3.9(4), (5)])

10.5 Related to *Directive 071: Emergency Preparedness and Response Requirements for the Petroleum Industry*

Manual #	Risk rating	Description
99.5.5.1	High Risk	Licensee did not have, get approval for, maintain, or submit to the AER on request a corporate emergency response plan (ERP) as required by *Directive 071*. (*Pipeline Rules* 8[1], [5], [6][a])
99.5.10.1	High Risk	Licensee did not have, get approval for, maintain, or submit to the AER on request a site-specific ERP as required by *Directive 071*. (*Pipeline Rules* 8[2], [4], [6][a])
99.5.15.1	High Risk	Licensee of a pipeline containing H_2S in the gas phase did not calculate the emergency planning zone (EPZ) in accordance with *Directive 071* and determine whether there was any surface development within the EPZ. (*Pipeline Rules* 8[3])
99.5.20.1	High Risk	Licensee did not conduct ERP training exercises in accordance with *Directive 071*. (*Pipeline Rules* 8[6][b])
99.5.25.1	High Risk	Licensee does not ensure that it is capable of adequately responding to spills in accordance with *Directive 071*. (*Pipeline Rules* 8[6][c]).
99.5.30.1	Low Risk	Operator not communicating with residents in the emergency planning zone (ERPs in existence prior to April 8, 2008). (*Directive 071* [2005 edition] [2.2.1]; *Bulletin 2008-15* [2.2])
99.5.35.1	High Risk	Copy of ERP not readily available (ERPs in existence prior to April 8, 2008). (*Directive 071* [2005 edition] [4.2.2]; *Bulletin 2008-15* [2.2])
99.5.40.1	High Risk	Failure to test the sour operation, HVP pipeline, or cavern storage facility ERP through tabletop and major exercises. (*Directive 071* [14.10(28)]; *Bulletin 2008-15* [2.2])
99.5.45.1	Low Risk	Failure to develop a public information package and/or to provide all required persons with a copy. (*Directive 071* [4.3.1(12)], table 3; *Bulletin 2008-15* [2.2])
99.5.50.1	High Risk	Failure to ensure that a call to the licensee 24-hour emergency telephone number initiates immediate action. (*Pipeline Rules* [6], *Directive 071* [2.1(3)])
99.5.55.1	High Risk	Failure to ensure that the equipment identified in the ERP is available and located where specified in the ERP for any operation. (*Directive 071* [14.4(16)]; *Bulletin 2008-15* [2.2])
99.5.60.1	High Risk	Failure to provide a copy of the public information package to all identified residences in the EPZ every two years and/or conduct a public awareness program with members of the public through personal consultative process. (*Directive 071* [14.6(23)]; *Bulletin 2008-15* [2.2])
99.5.65.1	Low Risk	Failure to carry out public and local authority notification and consultation. (*Directive 071* [13.1(1)], table 8; *Bulletin 2008-15* [2.2])
99.5.70.1	High Risk	Failure to distribute changes in information that are instrumental to implementing the ERP to all required plan holders. (*Directive 071* [14.6(24)]; *Bulletin 2008-15* [2.2])

Manual #	Risk rating	Description
99.5.75.1	Low Risk	Failure to distribute copies of the sour operations, HVP pipeline, cavern storage facility, sour well site specific drilling and/or completion ERP, or approved supplement to government departments and agencies within 10 business days after approval, unless the government agency requests otherwise in writing. (*Directive 071* [5.7(15)], [7.3.3(11)], [9.3.2(7)], Appendix 5; *Bulletin 2008-15* [2.2])
99.5.80.1	Low Risk	Failure to notify the AER field centre about a major exercise and/or invite the local authority, Alberta Health Services, or any other government agency to participate or observe. (*Pipeline Rules* [6], *Directive 071* [14.10(29)]; *Bulletin 2008-15* [2.2])
99.5.85.1	Low Risk	Failure to provide a copy of the public information package to the local AER field centre. (*Directive 071* [4.3.1(13)]; *Bulletin 2008-15* [2.2])
99.5.90.1	High Risk	Failure to immediately contact the AER after activating internal response resources to confirm the level of emergency and convey the specifics of the incident. (*Directive 071* [11.1.1(4)], [14.2(4)]; *Bulletin 2008-15* [2.2])

10.6 Related to Other AER Requirements

Manual #	Risk rating	Description
100.1.5.1	Low Risk	Noncompliant with other low risk AER requirement(s). See comments for details. (Refer to the applicable AER requirement.)
100.1.10.1	High Risk	Noncompliant with other high risk AER requirement(s). See comments for details. (Refer to the applicable AER requirement.)

Appendix 1 References and Contacts

A1.1 AER Documents

Acts and Rules

Pipeline Act
Pipeline Rules

Bulletins

Bulletin 2008-15: New Edition of Directive 071: Emergency Preparedness and Response Requirements for the Petroleum Industry *Issued*

Directives

Directive 038: Noise Control
Directive 055: Storage Requirements for the Upstream Petroleum Industry
Directive 056: Energy Development Applications and Schedules
Directive 058: Oilfield Waste Management Requirements for the Upstream Petroleum Industry
Directive 060: Upstream Petroleum Industry Flaring, Incinerating, and Venting
Directive 071: Emergency Preparedness and Response for the Upstream Petroleum Industry (2005 edition)
Directive 071: Emergency Preparedness and Response for the Upstream Petroleum Industry (2008 edition)
Directive 077: Pipelines – Requirements and Reference Tools

Interim Directives

ID 99-04: Deposition of Oilfield Waste into Landfills
ID 2000-03: Harmonization of Waste Management and Memorandum of Understanding between the Alberta Energy and Utilities Board and Alberta Environment.

Information Letters

IL 98-02: Suspension, Abandonment, Decontamination, and Surface Land Reclamation of Upstream Oil and Gas Facilities

A1.2 AER Contacts

Applications Branch

Facilities Applications: 403-297-4369
Resources Applications: 403-297-6957

Customer Contact Centre and the Energy/Environmental Emergency & Operational Complaint 24-Hour Response Line

Customer Contact Centre: 403-297-8311
Energy/Environmental Emergency & Operational Complaint Response Line: 1-800-222-6514

Environment and Operational Performance Branch

EPA Help Line: 403-297-2625
Liability Management: 403-297-3710
Pipeline Operations: PipelineOperations@aer.ca
Technical Operations: 403-297-6179
Compliance Assurance: 403-297-6179 or ComplianceCoordination@aer.ca

Field Centres and Offices

Bonnyville: 780-826-5352
Drayton Valley: 780-542-5182
Fort McMurray Office: 780-743-7214
Grande Prairie: 780-538-5138
High Level: 780-926-5399
Medicine Hat: 403-527-3385
Midnapore: 403-297-8303
Red Deer: 403-340-5454
Wainwright: 780-842-7570

Information Collection and Dissemination

Information Product Services Section: 403-297-8190 (or 403-297-8311, select 2)

A1.3 Other Contacts

Alberta One Call, Locate Request Inquiries
- Phone: 1-800-242-3447
- Fax: 1-800-940-3447
- Website: www.alberta1call.com

Alberta Utilities Commission Complaint Line: 780-427-4903
Workplace Health and Safety: 1-866-415-8690
Alberta Common Ground Alliance (ABCGA): 1-877-832-2371
- Website: www.albertacga.ca